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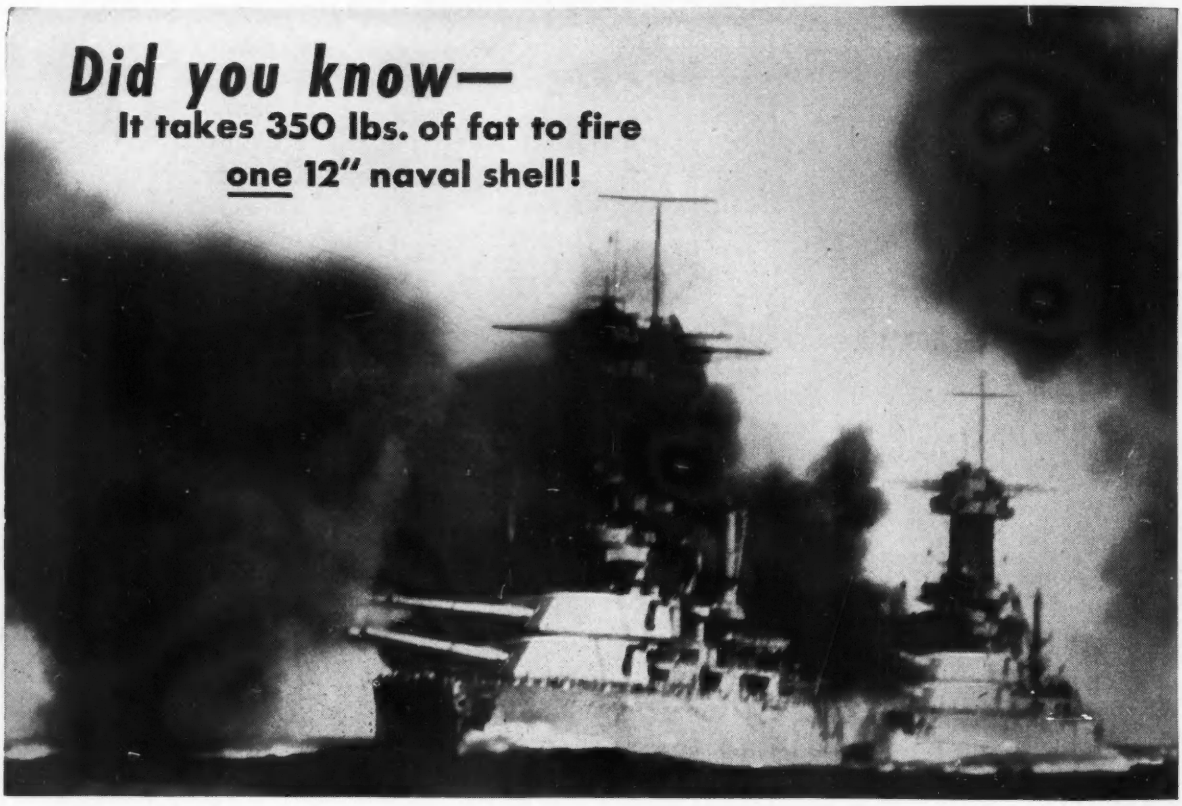

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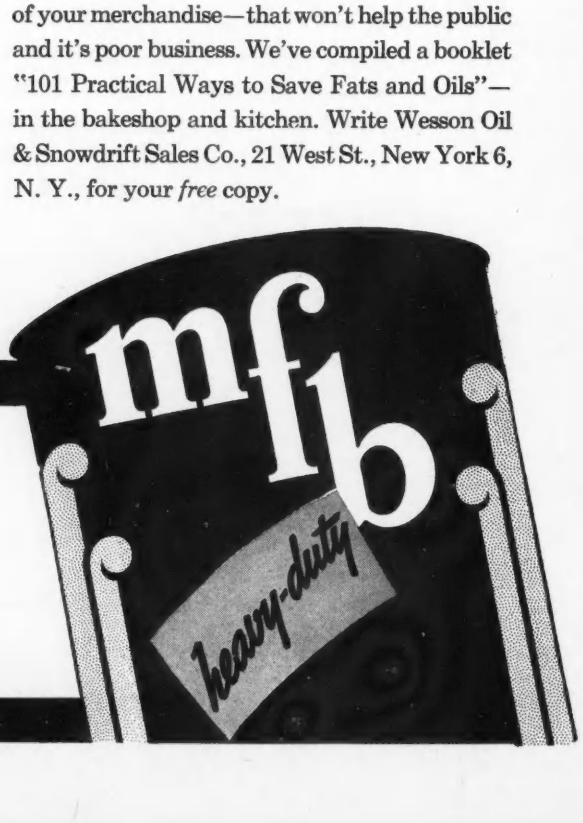

THE FOOD SITUATION IN NORWAY[1]

ELSE MARGRETE ROED[2]

Royal Norwegian Information Services, New York

A PEOPLE'S standard of living is more than just a measure of what it has to eat; it is a picture of that people's whole cultural, economic, and social condition.

Norway had one of the highest standards of living in the world before the German invasion. No one had to go hungry in Norway—but the Norwegian standard of living consisted of far more than that. Education was free and open to all through the university. Universal health insurance and pensions for the aged robbed disease and old age of many of their terrors. Our art and literature and science were flourishing, and so were our industries—manufacturing, agriculture, mining, lumbering, fisheries, and above all, our shipping. Although Norway was a country of less than three million people, our fisheries were the largest in the world, and our merchant marine was the third largest. Indeed, it was primarily due to our shipping that we were able to attain our high standard of living, since this industry brought capital to the country and provided essentials we could not produce ourselves.

When the Germans marched into Poland the Norwegian authorities began at once to buy up vast stocks of flour, sugar, coffee, tea, chocolate, tobacco, gasoline and other goods which we did not produce ourselves. Not that we were afraid of war. None of us thought a little country which had lived in peace for a century and a quarter would be attacked. But we took into account the possibility of a partial blockade, and at the same time worked out a nutrition plan which would enable us to achieve an adequate diet through use of native products—fish, herring, potatoes, dairy products, eggs, cod liver oil, and home-grown meat, vegetables and fruits. With these products, plus the huge reserves of flour and sugar which the government had built up for such an emergency, we counted on being able to get through several years of even total blockade without difficulty—perhaps even longer with stricter rationing.

Then, without even a declaration of war, the Germans came in April 1940. We were taken completely by surprise, and though we fought valiantly with all the means at our disposal, Norway was a Nazi-occupied country after 62 days and under the iron German heel. They descended upon us like locusts and devoured everything in their way. Not only did we have three or four hundred thousand greedy Germans to feed in Norway; the German transports which brought them to us sailed back laden with Norwegian food and other goods. The wholesale German exploitation of Norway started at once.

One familiar article of diet after another disappeared from the market. First eggs, then meat, wheat flour, coffee, cream, milk, chocolate, tea, canned fish, fruit and vegetables and, finally, cheese and fresh fish—all disappeared down the German mouths.

The food situation in Norway has become steadily and progressively worse month by month during the occupation. Long ago the people back home stopped talking about what they cannot get; now it is only a question of what they *can* get.

Practically everything a human being can put into his mouth and try to swallow is rationed, but even so the ration cards allow an adult Norwegian only about 1500 calories a day, scarcely half what he needs. And still he has no guarantee that he will be able to buy the rationed fat, sugar and skim milk to which he is entitled. The theoretical daily ration is: 25 gm. oleomargarine, 1 lb. potatoes, ½ lb. bread, 1 cup skim milk, 25 gm. sugar, a little coffee substitute, and four times a year a little cheese of low-fat content. You are allowed half a pound of molasses twice a year and a pound of apples once a year. The bread you buy is dark and soggy and is made of several kinds of coarsely ground grain. It is hopeless to try to bake it yourself.

Other than these rationed wares, you can still buy dried codfish, seagulls, crows, and certain strange kinds of fish which were formerly considered unfit for human consumption, as well as salt, vinegar, and all sorts of ersatz—ersatz seasoning, tea ersatz made of pine needles and dried leaves, fruit juice ersatz with artificial flavor, artificial sweetening, and artificial aroma.

The situation with regard to fats is the most difficult, especially since the severe climate in Norway makes the need for fats very great. The official ration is 30 gm. a day but 6 or 8 weeks may pass before it is possible to find any oleomargarine on the market, and even that is stretched with as much as 30 per cent water. This oleomargarine is now virtually the only source of fat. During the first year of the occupation it was possible to get cod liver oil, but now this has gone the same way as everything else—to Germany. Pork went there long ago, and adults get only one cup of skim milk a day—if they are lucky. Since the Germans have forbidden all sale and transport of herring, one of the main supports of our diet has been swept away. Meat has disappeared—even horse meat and whale meat are no longer obtainable—hence the lack of protein has become serious. The situation in regard to carbohydrates, however, is somewhat better.

The official ration is lacking especially in protein, calcium, iron, and vitamin C, and for adults, vitamin A and D as well. Small children, fortunately, are allowed a spoonful of cod liver oil and a half pint of milk a day.

Those who eat away from home cannot make their rations stretch far enough, since the restaurants demand points for every little thing,—that is, if the few restaurants the Germans have not taken over have anything left to serve, which is doubtful. Hence the whole task of keeping people alive falls upon the housewives. And, as a housewife, I can tell you that it is not only difficult to satisfy hunger on these rations, it is difficult to learn to prepare food without flour, milk, butter or eggs.

You may wonder how the Norwegians under such conditions can still be alive; more amazing is the fact that they are able to maintain the resistance such as is described in every report we receive from Norway. Christmas Moeler, the free Danish leader in London, recently said, "The shining example of the Norwegian people has been like a guiding light in the dark. The contribution made by the Norwegian people cannot be overestimated."

But in my opinion the stubborn unarmed fight and the unbreakable resistance on the Norwegian home front would not have been possible without the Norwegian woman. It is her intelligence and undaunted courage which have kept us alive. And her most important battlefield has been the kitchen—where she stretches the small rations as far as possible, struggles to get hold of the

[1] Presented before the American Dietetic Association, Pittsburgh, October 22, 1943.

[2] Miss Roed, who has studied at the University of Oslo and in Germany, France, and Oxford University, England, was editor of a daily newspaper in Norway prior to her escape from that country last fall. She is now an officer attached to the Norwegian Government-in-Exile with offices at 30 Rockfeller Plaza, New York, where she works in cooperation with the Royal Norwegian Embassy, Washington.

rations, and works and fights to find something to eat in addition to the rations.

Fortunately, our women were relatively well prepared to meet these difficulties. Long before the war we conducted an educational campaign to make all classes of society familiar with the science of nutrition. Not only were there domestic science courses in the elementary schools and special training schools in housekeeping which most Norwegian girls attended as a matter of course; traveling teachers and lecturers had made the women of all classes of society and all parts of the country familiar with the latest knowledge about calories, carbohydrates, fats, and vitamins. But no woman had been trained to stand in line overnight hoping to get a few frozen fish or a few seagulls by morning.

I will try to give you a true picture of what the women have had to do to maintain the home front and keep their families from dropping dead literally of hunger. A housewife usually has to stand in line for 8 hours to get half a pound of margarine, and sometimes as long for potatoes. For all necessities it is the same. Many of the stores have been closed by the Germans, and those still open never get sufficient to supply all their customers. Often, after hours in line, you have to return home, with net or basket empty. But thousands of German women in Oslo, those who came to us after the bombing of Hamburg, Bremen and Lubeck, never wait in line. They have their own stores, *for Germans only*, as well as their own counters in the Norwegian stores where they can buy butter and eggs and cheese and other things a Norwegian housewife has not had in her house for more than two years. Or if there are no counters for Germans, the German *Hausfrau* just enters a store ahead of the line and takes whatever she wants! What does she care for the Norwegian women! She belongs to the master race, so why not? You must not ask the Norwegian women ever to love the German women, nor to pity them when the war is over and the defeated Germans begin to whine. We shall never forget these German women, how they enjoyed the privileges of *das Herrenwolk*. They are no whit better than the men. Norway helped German children by the thousands after the last war. We opened our homes to them, treated them like our own children; twenty-five years afterwards they came as grown men in uniform and with brutal force to pay a visit to their foster parents. We have learned our lesson!

But to get back to the Norwegian woman and her problems. When she has struggled to get the small rations to which she is entitled, the work of getting something in addition to the rations begins. These extras are absolutely necessary for the family's existence. You can keep alive for a little while on 1500 calories, but you cannot maintain your strength, nor even keep alive indefinitely. Here the Norwegian housewife has shown her greatest skill. Her ingenuity has been almost beyond belief.

We have discovered that almost everything that grows in the fields, in the forests and along the roadside can be made to serve for human food. And from early spring until the October frost has killed the last growing plant you will find women and children in the vicinity of the cities scouring the fields and the roadsides for plants which will add a little variety and bulk to their diet and provide vitamins for the winter. The nearby forests are fine-combed for mushrooms and berries. Dandelions and sorrel and nettles, mushrooms, acorns, berries, leaves and nuts all have their uses.

There is no more tea or coffee, but mint and linden flowers, strawberry and rose leaves can be dried and served as tea, and acorns as coffee substitute.

The wild berries for the most part have to be dried. Nobody has sugar for jam or marmalade and there are no fruit jars available for canning. The mushrooms are either dried or salted, as are nettles and other greens. In the winter they are used for stews or soups. But here the German rule forbidding Norwegian travel by bus or rail except when it is a matter almost of life and death, prevents the full use of the resources of forest and field. All cars were, of course, confiscated long ago. Those who have a good pair of walking shoes, not to mention a bicycle, are in a very fortunate situation.

The children go out and set snares for crows and seagulls. Everyone who can, has a rabbit hutch, and the owners have plenty to do to gather grass and weeds along the highways to satisfy the tremendous appetites of these animals. There are even optimists who secretly keep a couple of underfed hens in the guest-room, in the hope of getting an egg for Christmas.

Every little plot of ground, even every window-box, is a "victory garden." Flower beds and lawns long ago were plowed up for potatoes and vegetables. The difficulty, however, has been to get seed. And nothing is thrown away; even the green leaves of radishes, carrots and beets are dried for winter use.

Those who do not have a little patch of their own have found one somewhere or share a friend's garden. But only those who have very modest plots indeed, are permitted to keep all they produce. If you have a garden of any size you always run the risk of having the amount you produce subtracted from your ration card. And there is the ever-present danger of a Gestapo raid—while they are searching the house for underground newspapers or secret weapons, they usually take advantage of the opportunity to carry off any food stored in the pantry which strikes their fancy.

The Norwegian woman, up to now, has managed to save the people from starving to death, thanks to her magnificent courage and her unbreakable will. But in spite of all her toil and care, she cannot keep the family really fed. Everyone is hungry all the time.

With the food situation as serious as it is, it is natural that in Norway today people think, dream, and talk about food. Along with resistance to the Germans and their hirelings and the war news (which is spread among the people through the underground press), food is the constantly recurring subject of thought and conversation. And the food situation in Norway is as serious as it can be. This hardship is somewhat mitigated by the fact that it has developed a wonderful feeling of community and mutual assistance. No particular group suffers less than another; the whole nation has suffered equally and all the people, rich and poor alike, are facing starvation.

Just before the war a scientific study of children between the ages of 16 and 18 was made in all civilized countries and the results showed that the Norwegians were the most physically fit in the entire world, with our neighbors the Swedes coming second. What is the situation today? The average adult has lost in weight 12 to 22 pounds. Older people have lost more than the young, but studies of school children show that the percentage of underweight children, unfortunately, is increasing dangerously. This loss of weight is accompanied by an increased feeling of hunger. People complain constantly of weariness, diminished ability to work, and dizziness, and they feel the cold more.

Not only are the people weak and exhausted from lack of food; epidemics and deficiency diseases, practically unknown in Norway before the German invasion, have already taken their toll. We see a great increase in tuberculosis, a disease well under control before the war. Diseases of the digestive tract have increased tremendously. It is difficult to get wheat flour for dietary purposes

and eggs are impossible to obtain, even for the sick. There are more cases of meningitis than we have had in decades, and more diphtheria and scarlet fever than we have had in Norway since the turn of the century. Skin diseases, scrofula and eczema, as well as diminished hearing and sight have resulted from the insufficient diet. And medical care has become difficult, since the Germans have requisitioned most of the hospitals.

Nevertheless, in spite of all this, life in Norway, in many respects, does go on in its usual pattern. The housewife tries to forget that acorns are not coffee and rutabagas not meat. She makes an effort to keep her spirits up, to set her table as nicely as possible and keep her house well. After all, people do have an almost incredible ability to adjust themselves to situations.

Strangely enough, all the material difficulties arising from the war and the German occupation are easier for the Norwegian housewife to bear than the steady psychological strain, the daily humiliations, the insecurity of life and property, the lawlessness. But in spite of all this, the Norwegians keep up their spirit. The desire to fight back is strong, and the whole mood of the people is marked by an unquenchable optimism. Hatred of the Germans and the struggle against them, as well as the unity of the Norwegians, work as a stimulus to keep the people going. In spite of hunger, oppression and terror, in spite of all lying promises and enemy blandishments, the Norwegian home front is unbreakable.

After the surrender of Italy one of the Norwegian underground papers had an article on the world situation. Let me cite the last few sentences: "The hardest struggle, at home and abroad, is still ahead. Now more than ever is it necessary to stand firm and immovable in the unarmed battle for the sake of our right. In this way *we* can help shorten the war. Let us with perseverance and courage make the sacrifices which are needed for our freedom and peace."

The spirit in Norway is excellent. Nevertheless, a people cannot live by spirit alone. We Norwegians who are outside our country often think with foreboding of the coming winter. A minimum of fuel, a minimum of food, and a scarcity of warm clothing, especially stockings and shoes, a steadily growing weariness and increased disease due to undernourishment—that is what faces the Norwegian home front this fourth winter under the German yoke. Last winter only dried codfish, by and large, kept the people alive. But the fishing this past year has been poor, so that the reserves are far from being as large as one could wish.

The Norwegian home front has been a staunch ally in the battle against Nazism, but if it is to continue until liberation or victory, the people must live, not die of hunger. Our Government-in-Exile in London has been working on the problem of sending food home to Norway. As far as I know now, it has not been successful. I think I am justified in saying that the people of Norway, who are not the least of our allies, have won the right to be alive on the day of victory. And those of us who are privileged to carry on Norway's fight outside the country have the right to hope for them, and for ourselves, that the struggle has not been in vain—that when the happy day comes when we can return to our country we shall find our compatriots alive and eager to reclaim and rebuild that which has been stolen from them.

The Starvation of Children in Occupied Countries

The plight of the civil population in enemy-occupied Europe causes much concern. An eye witness has described the children in Athens as "without strength to beg." One child said "I have lost my mother: she died of hunger; my brother died last night because he had not eaten anything for four days." The Athens Welfare Service reports that 9 out of 10 children die before they reach the age of 6 months. An arrangement was made to relax the blockade and allow 100 tons of dried Canadian milk to be imported monthly, a bare pittance for a child population of 2,000,000. Under an earlier plan, suggested by Sweden, 15,000 tons of wheat has been sent monthly since August, but cereal without milk and vitamins is deficient and increases rickets. A famine relief committee is supported by the Archbishop of Canterbury and the Cardinal Archbishop of Westminster in a plea to the British Government to send enough dried milk and vitamins to maintain the lives of children under 16 and of expectant and nursing mothers in Greece and Belgium.

H. E. Kershner, director of relief, American Friends Service Committee, states that close study of the continent convinces him that in order to shorten the war and make reconstruction less difficult we should save what we can of the children left in the occupied countries. He has seen the weights of the newborn fall to almost half normal and infant mortality climb to thrice normal. He has seen the children of southern France practically stop growing and a large percentage lose weight. Many lost their memory and learned nothing in school. Many are kept in bed to conserve their strength. For lack of clothing, some go to school only on warm days or on alternate days, using one another's clothing. Even in countries normally self-sufficient in basic foodstuffs, such as the Netherlands and Norway, requisition of the country's produce, by means either overt or covert, has debased the standard of living, threatening the young, while in Poland and Yugoslavia one must ask how many children will be left alive after another year of war.—*Foreign Letters, J. A. M. A. 121: 1104, 1943.*

Greece—Yesterday, Today and Tomorrow

Characteristic of the Greeks are their kindness and hospitality. They are very intelligent and very inquisitive. They also have great vitality, which makes for a vigorous quality in their politics. Extremely democratic in tendency, they are individualists. Their progress in the past has been greatly aided by American capital and American engineering skill. . . .

On October 20, 1940 Italy presented an ultimatum at 3 a.m. and demanded that the northern provinces of Greece be ceded to Mussolini and the rest of the country be used for military operations. Less than 48 hours before, Italian Government officials had entertained Greek officials and promised that no matter what the course of the war, Italy and Greece would remain friends. The highlanders went up into the mountain passes and contacted the enemy that night. The women went down to munition centers and supply depots and took cases of munitions on their backs and great sacks of foodstuffs. They walked for 10 and 12 hours over those cold mountain passes, through snow and ice, right up to the firing line. In this way they saved Greece and perhaps saved democracy because of the final effect of that campaign on the course of the war. Surging with indignation, determination, and a spiritual strength that had never been seen before, they drove the Italians out of the mountain passes. It was the whole people, not just the army, which performed the miracle. They held the Germans back for 7 weeks, and the number of Germans and Italians killed was 6000. Before the German invasion, Greece had a great mercantile marine,which the Germans did not get, 55% of which has been sunk in the service of the United Nations.

When the Germans did get into Greece, they systematically stole every bit of food, including the potatoes from the fields, which they canned on the spot and sent back to Germany. Since then, over 880,000 people have died of starvation in Greece.

When the Germans entered Macedonia and Thrace, they expelled 80,000 farmers from their farms, and massacred 20,000 in cold blood in the town.

There is no one in Greece today who complains. The people have not cooperated with the Germans. They are resisting with all their might.—*Excerpts from an address by Andre Michalopoulos, former Greek Minister of Information, before the American Dietetic Association, Pittsburgh, October 21, 1943.*

PLANNING FOODS FOR FOREIGN RELIEF[1]

HELEN S. MITCHELL, PH.D.

Chief Nutritionist, Office of Foreign Relief and Rehabilitation Operations, Washington

WHEN you hear someone casually mention European food relief do you ever stop to think of the many problems involved in such a program? Have you asked yourself some of the questions which a foreign relief agency must answer in some form before it can proceed with its planning? How many people in Europe need food? Where are they? How much can they produce for themselves? What kind of food do they need from outside? What is the nearest country from which these foods may be obtained? Will the same types of foods serve as a complete ration or as a supplementary ration to foods available locally? What are the shipping facilities today and what are the future prospects?

Then when it comes actually to planning the foods which may be shipped from the United States there are many more questions which a dietitian in an institution in this country would never encounter. First of all, what foods are available in sufficient quantities to meet the anticipated requirements? Which of these foods are familiar in Europe and will be acceptable to European homemakers without elaborate directions for use? Can these foods be shipped without processing? What forms of processed foods will serve to carry unfamiliar products such as soybeans? Will these various foods stockpile successfully without spoilage of any kind for 6 to 9 months or more?

In brief, the job entails selecting from the available foods those which meet the nutritional needs of liberated areas and supplying these foods in the forms which will be familiar and acceptable to the liberated peoples.

It has taken the knowledge of experts and considerable research to answer many of these questions even tentatively and to answer many more which are fundamental to an intelligent and realistic approach to the planning of foods for foreign relief. The provision of adequate foods for civilians is necessary not only from a humanitarian standpoint but for strategic and military reasons as well. In North Africa there was a striking demonstration of how food and clothing for liberated populations could become an integral part of a military operation by strengthening and consolidating the support given our armed forces by local civilians. The Army recognizes the importance of such a program and is training officers to take charge of civilian affairs. The Army is assuming the responsibility of feeding the civilians during military operations and for as long as 6 months after, after which civilian agencies will probably be asked to take charge. The speed and success of rehabilitation in any country are dependent upon the adequacy of the food supply in restoring physical strength and the will to work. Semi-starvation or extreme malnutrition weakens the initiative and ambition of the most progressive people; but with initial help from the outside they can do much to help themselves, and that is what they want to do.

As Governor Lehman stated in a recent article in the *American Magazine:*

> No, we are not going to try to feed the whole world. That, obviously, is impossible. But we and the other United Nations, by pooling our resources, are convinced that we can find enough foodstuffs to try to stop death by starvation, to add enough to the local supplies so that people will have sufficient nourishment to keep alive and to work toward restoration of their lives and their economies—that is, under present emergency conditions a bare subsistence of 2000 calories a day. . . . So you see we have no extravagant ideals.

The scientific committees of the United Nations have given thoughtful and detailed consideration to the nutritional needs of each country. The Leith-Ross Technical Advisory Committee on Nutrition made up of British, American, and government-in-exile representatives, has made all of its reports available to American committees considering foreign relief problems. They have all generally agreed that in the early emergency period an attempt should be made to provide for absolute necessities for as many people as possible and that more liberal allowances should be given as soon as production and shipping facilities permit. Naturally, with the limited food supply in the United States available for all purposes, including civilians, the armed forces, lend-lease, and foreign relief, the choice of foods available for civilians in liberated areas is extremely limited and we cannot possibly provide all of the foods that might be desirable. The only alternative is to make the best possible use of foods which are available and which will most nearly provide the nutritional elements needed to supplement foods being produced in the various countries. In all of this planning, the restoration in some degree of prewar food standards is the goal—not a revolutionizing of the food habits and standards of any country. We are more than willing to leave the nutrition education and improvement of food habits to the health authorities in each country. Field staffs working in each country will be instructed to estimate needs in terms of usual consumption patterns and not in terms of American food habits.

In Europe today agricultural production is confined largely to vegetable foods, some grain and fruits, with drastic curtailment in livestock, poultry, and dairy products, due to a shortage of feedstuffs. Europe normally imported large amounts of grain foods and cannot, even with war adaptation, supply all of her needs. Both supply and need dictate that *grains* will be the major item in all relief programs. The grains which are available—wheat plus smaller amounts of oats, corn, barley and rice—will be sent where they are most acceptable and where there is evidence of the greatest need.

Oils and fats have normally been imported by most European countries and are now among the items most drastically curtailed in food rationing. The limited amount of fats available will be sent where most needed. Naturally where there is an abundance of olive oil no other types of fats or oils will need to be supplied. Margarine and lard will be the forms shipped from the United States because stable oils are scarce and solid fats ship and stockpile to better advantage.

Legumes (known as pulses in Europe) are widely used but certain varieties (navy beans and yellow split peas) are most popular in the North and West and quite different types (chick peas, blackeye peas, and lentils) in the South and East. Attention will be given to planning the distribution of legumes according to acceptability so far as possible, with due regard to the fact that a shortage of certain types may influence the supply and distribution. Some of the Central and South American countries have normally exported legumes to Europe and may still be able to produce the types most in demand.

Fish has normally been used extensively in most all of the countries or areas bordering the coast. During the war the fishing industry has been severely curtailed but fish is an acceptable food and an unused supply can probably be tapped in the United States or elsewhere. Squid from the Pacific Coast and lesser known varieties of fish on the Atlantic Coast are being canned for Southern Europe, to supplement the standard varieties of fish.

[1] Read before the American Dietetic Association, Pittsburgh, October 19, 1943.

Fruits, although these are perennial crops, will be produced in less than normal amounts because of the scarcity of insecticides and sprays—and even the fruit which is produced may be wasted in part for lack of adequate distribution and conservation facilities. Thus one locality may have grapes and olives, another citrus fruits, another vegetables and dairy herds, making the total production for the country as a whole appear on paper to be fairly adequate in variety if not in quantity. Actually it may not mean that any one locality ever gets all of the items—take for instance Sicily, abounding in wines and watermelons, but in need of some of the staple foods. According to Quentin Reynolds in *Collier's* for October 2:

> Grain and wheat were the things most wanted. Sicily is as fertile as Iowa or Ohio (except for the mountainous portions of the island) and wheat grows to such an extent that six hundred thousand tons a year have been shipped to the mainland.
>
> Now there are two kinds of wheat—the kind you make bread from and the kind you make spaghetti and macaroni from. Sicily has always specialized in the latter type. In exchange for this six hundred thousand tons per year, Rome paid Sicily partly in lire (at what was virtually a confiscatory rate) and partly in the kind of wheat used in making bread. This type of wheat was sadly lacking when we marched into such cities as Syracuse, Ragusa, Vittoria, Caltagirone and, of course, Palermo. People cried out piteously for bread.

Dairy products are in short supply both in Europe and in America but an attempt will be made to supply milk in some form for infants and for pregnant and nursing mothers. It is probable that little milk will be available for adults except that incorporated in processed foods. The form of milk commonly used and recommended for infants and children varies considerably in different countries. Condensed milk has been better known in some parts of Europe than evaporated but is not, as you know, recommended by pediatricians in this country. Dry milk has been used in some countries, while it is quite unfamiliar in others. Greece, for instance, in recent prewar years, has imported dry milk from Holland for use in infant feeding and in *café au lait* for adults. Thus dry milk is familiar in Greece but less so in other Balkan states where dairying was more successful and fresh milk available.

The inadequate supply of meats, fish, and dairy products in the United States and in other allied countries makes it necessary to provide protein and fats from other sources, if possible. At the same time it is essential that foods be palatable and acceptable to the population groups for which they are provided. Working with us in the development of new products, the commodity branches of the Food Distribution Administration have been assuming responsibility. You know how difficult it has been to educate American homemakers in the use of new foods, even with adequate time and educational facilities. There will be neither time nor facilities to introduce unfamiliar foods in other countries under war relief conditions. Without education such products might be wasted or used to poor advantage. If the same ingredients can be combined in familiar and acceptable forms, the possibility of utilizing the food products which are available will be vastly increased. A few examples of how unfamiliar food products can be utilized will serve to illustrate this point:

Dehydrated soup powder is now being manufactured of peas, soybeans, dry skim milk, brewers' yeast and seasoning. This soup provides about 39 per cent protein on the dry basis and a liberal proportion of the day's requirement of calcium, iron, thiamin, riboflavin, and niacin. This type of puréed soup, with a milk base, is almost a complete food and is acceptable in Northern and Western Europe and in some parts of Southern Europe wherever milk soups fit into the food pattern. The soybeans, dry milk and yeast alone might be unfamiliar to many housewives, but a dehydrated soup with directions for preparation is familiar in Europe. Actually this soup was planned for use principally in central feeding operations where it would be prepared under supervision, but it may prove to be quite as acceptable for home use.

In most of Southern Europe meat stock is the base for thick soups made with a variety of vegetables cut in pieces. Therefore a *dehydrated vegetable stew* made of precooked beans and peas, soybean grits, whole grains such as barley, and dehydrated diced vegetables, plus brewers' yeast and meat seasoning, is a product which may better fit the local food pattern and can be made to provide much the same food value as the soup powder described above.

Paste foods (known as *pâté alimentaire* or *pastas*) are acceptable in nearly every country of Europe and can be made to carry extra nutrients by introducing ingredients of higher nutritive value for a part of the wheat flour. A high-protein spaghetti has been developed, for instance, made with 10 to 15 per cent of soybean flour and a small amount of egg replacing less than a fifth of the wheat flour. This product has good consistency, excellent flavor, and about 18 per cent protein of better quality than would be provided by wheat flour alone. Ordinary paste foods contain about 12 per cent protein on the dry basis. Spaghetti, rather than macaroni, is the form recommended for manufacture in this country because it is more compact and hence ships in smaller compass (31 cubic inches to the pound compared with 45 cubic inches for macaroni). The paste product has the additional advantage of good keeping quality for stockpiling without refrigeration, provided it is shipped in waterproof containers. It is subject to insect infestation, however, if kept too long in hot climates; thus a reasonably prompt turnover (within 6 to 9 months) is desirable.

Manufacturing facilities in this country would be severely taxed, however, if they attempted to meet Europe's full relief needs for spaghetti and they may prefer to make their own. Therefore, a dry paste food mix from which the European manufacturer and homemaker may make their own macaroni, spaghetti, or noodles, is being developed using a small proportion of soybean flour and dried egg and a high-gluten wheat. Neither the soybean flour nor the dried eggs, shipped separately, would be familiar and might not be used effectively. This mixture can be packaged with directions for making the familiar paste foods and will provide much the same nutritive value as the spaghetti described above. The same mixture might be used for a variety of other purposes such as quick breads, muffins, and pancakes.

A *porridge* or *cereal mixture*, made with wheat or oats, soybean grits, with or without dry skim milk, is another product which can be produced from available foods. Acceptability may vary considerably among different nationality groups, as experience with this type of product has demonstrated. One of the samples first submitted to a Southern European group was made of finely ground oats and contained about 8 per cent sugar. Comments subsequently disclosed that oats were not popular in Southern Europe and that wheat was preferred, while cereal was never eaten as a porridge except by children. Adults used it only as an accompaniment to vegetables and meats and for this purpose it should contain no added sugar and be much coarser in texture, like grits or rice. All of these faults can easily be corrected.

These special foods make up but a small proportion of the relief foods, as has been said. If it becomes necessary to provide all the food to groups of refugees or to a city cut off from local supplies for short periods, a subsistence ration of foods could be made available. Table 1 shows what such a ration might furnish in terms of nutrients.

This 2000-calorie relief ration provides a liberal amount of protein largely from plant sources (grains and legumes) adequate iron and vitamin B complex, but is low necessarily in fat, calcium, vitamins A and C. The deficiency of vitamin C which will probably occur in certain localities where there is no local source available can be met only by providing synthetic ascorbic acid in an acceptable carrier. Various relief agencies have been giving consideration to such items as powdered lemon juice, citrus concentrates, fortified chocolate bars, or the fortification of other foods, but each has been discarded for some reason—poor acceptability, lack of stability, insufficient supply, or shipping and distribution problems. We are now contemplating a fortified dry milk for infants, and a lemon drop (hard candy) for school children. That, plus the small amount of vitamin C from potatoes and other vegetables, would be adequate for children. As life returns to a degree of normalcy, local sources of vitamin C may be tapped in many European countries. Rose hips, black currants, pine needles, turnip juice, are all potential sources

TABLE 1

Tentative daily relief ration; approximate nutritive value

FOOD	OZ.	CALORIES	PROTEIN	FAT	CALCIUM	IRON	VITAMIN A	THIAMIN	RIBOFLAVIN	NIACIN	ASCORBIC ACID†
			gm.	*gm.*	*mg.*	*mg.*	*I.U.*	*mcg.*	*mcg.*	*mg.*	*mg.*
Grains (including flour and meal)	11	1177	37	6	140	15.4	47	1100	308	1.5	0
Paste food (spaghetti or mix)	2.5	255	12	1	16	1.0	40	133	52	2.5	0
Soup, stew or pulses	4										
Pulses* (2 oz.)		197	12	1	84	5.8	0	300	180	1.6	0
Soup or stew (2 oz.)		192	15	2	70	4.0	180	112	223	.5	0
Meat, fish or cheese	1										
Meat (1 oz.)		36	1	3	1	.2	0	110	37	.8	0
Fish (1 oz.)		16	2	1	2	.1	24	10	12	.2	0
Cheese (1 oz.)		37	2	3	82	.1	160	3	37	—	0
Oil, lard or margarine	0.5	110	0	12	—	—	300	—	—	—	0
Sugar	0.5	56	—	—	—	—	—	—	—	—	0
Coffee**	0.3										
Cocoa**	0.2										
Total	20.0	2076	81	29	395	26.6	751	1768	849	7.1	0

* Package units appropriate for distribution in family units.

** Coffee and cocoa—desirable for morale and satiety value, not for food value. Probably available from outside the U. S.

† Ascorbic acid may be provided in fortified lemon drops or in some other carrier if not available from local sources.

Note: Other items may be added to this ration as supplies, shipping space and distribution facilities permit. Such items might be dry milk, condensed milk, dried fruit and more variety in other products.

but require time and facilities for preparation and distribution.

From this brief sketch you can see how the nutritive values from locally grown foods and from those provided in the relief ration tend to supplement each other to a certain extent. In general, the local foods provide carbohydrate calories, with a fair supply of vitamin A and iron if greens and yellow vegetables are used. Protein, fat, calcium and the vitamin B complex are low and vitamin C is limited to areas where fresh fruits and vegetables are available.

Each processed food which has been developed or proposed is subjected to rigid scrutiny by experts who apply such criteria as: Does the nutritive value justify its consideration? Is it worth the price in money and shipping space? Is it absolutely necessary to supplement local supplies? Is it acceptable to various nationality groups? Will it ship and stockpile without spoilage?

Acceptability testing with nationality groups in this country is something of a new venture, responsibility for which has been assumed by the Food Habits Committee of the National Research Council. Dr. Margaret Mead and her assistants, Drs. Natalie Joffe and Patricia Woodward, have been especially interested and have taken full responsibility for this project. The results of the tests to date have more than justified the trouble and expense involved and have been used as a guide in modifying specifications for processed foods now being considered.

In addition to comments on the acceptability of a product, these groups have also recommended certain changes to make a food conform more nearly to the national food pattern, have made valuable suggestions in regard to varying the use of a single product, and have offered to prepare recipes using the products in question along with other foods which would be available. For instance, one nationality group suggested that a popular dish called *plukfisk* could be prepared satisfactorily from the soybean spaghetti and the ground fish loaf which had also been submitted for testing. Another group discovered that a molded loaf could be prepared from the soup mix by cooking with less water and chilling.

General comments from the various nationality groups on food habits and likes and dislikes in their native countries have confirmed information on the general food pattern of countries as derived from over-all production, import and export data. However, such data do not describe how foods are customarily used or the attitudes toward such foods. Corn meal may be relished for *polenta* in Italy and in certain areas of Yugoslavia, while in other countries it may be acceptable only as a last resort. The extensive use of wheat in Greece is almost entirely for bread while in other countries in the Mediterranean area cracked wheat may be used with vegetables in goulash or *cous-cous*. Thus, the use may alter materially the form in which a food should be shipped. In many instances this problem may be solved by allowing grain to be milled locally.

At a later period it may be possible to plan food shipments to fit the food patterns and specific needs of each country, but the present procedure of planning simple processed foods to meet relief needs must be carried on with the needs of several countries in mind. After some study of the food patterns of Europe there appear to be certain common denominator foods for whole areas. The fringe countries group themselves conveniently into two divisions: those bordering the Mediterranean, and the Scandinavian and Low Countries. American food patterns bear more similarity to the western area, therefore more attention had to be given to planning for the southern group.

Special consideration has been given to the food needs of pregnant and nursing mothers, infants and children, workers, and invalids. In the early emergency extra calories, where necessary, and milk in some form for infants and mothers may be the most that can be provided. The extra vitamins essential for the latter groups may be provided in some form of fortified milk, now being investigated, or in synthetic form. Certain items in the regular basic food list are quite suitable for infant feeding if properly prepared, as are some of the items in the Army K ration recently investigated with this in mind by the Children's Bureau.

In all instructions given to the field staff, emphasis is placed on the feeding of pregnant and nursing mothers and young children as a separate group in any central or mass feeding program. This plan would avoid undue waiting in line and would provide opportunity for issuing special foods to these groups. When home distribution of food is instituted mother and child health centers may be the channels through which special foods or food supplements will be issued.

In general, distribution of food for home use will probably be preferred to central feeding for the large mass of the population. Where necessary, this food may be issued free but more often it will be sold through established trade channels in conformity with local rationing plans. School children and industrial workers may be given an extra meal away from home, thus providing an opportunity for giving them the extra or special foods needed.

Thus, the planning of foods for foreign relief involves many other considerations which seldom confront a dietitian or nutritionist in this country. Nutritional requirements should be met from local supplies so far as possible, supplemented by imported foods to supply essential nutrients. The foods shipped in should be in as palatable a form as possible, such as familiar grains and legumes now available in liberal amounts, and a variety of other items such as skim milk, fats and oils, fish, meat, dehydrated vegetables, and fruits available in very limited quantities.

In attempting to relieve starvation and come as near to the nutrition "yardstick" standards as is feasible, it is important to plan ahead so that standards established during the initial period or in one country may be maintained during later periods and in other countries in order to be as fair as possible.

Every effort has been made to keep to a minimum the number of separate items to be handled, especially during the early emergency period, and to conserve shipping space by the use of dry foods and compact packaging. As few strategic materials as possible are used in packaging: products canned in tin are used only where no other method of preservation is feasible; glass is barred because of weight and breakage. Most foods must be packed in moistureproof and verminproof containers which are able to withstand rough handling. The Army and Navy have learned by experience the rigid specifications necessary in packaging food so that it may reach its destination in good condition. Not the least important consideration is that of providing foods which fit the food pattern of the various countries or groups of countries in the same geographic vicinity. Better use and less waste of food, the better nutrition possible when people like what they are eating, and the more rapid restoration of good will and self-confidence are all to be gained by due consideration of the types of foods to be provided.

Planning to make good the food deficiencies of each country, based on the knowledge of local supplies, also complicates the picture. Current information on wartime food production when it is available, along with peacetime figures on usual production, imports and exports, allows us to form a picture of normal food consumption patterns and present discrepancies.

It is impossible for several reasons to give details regarding the calculations of total requirements, the share the United States might be able to furnish, and the production, transportation, and storage facilities for which detailed plans and commitments must be made. Much of the information and statistics upon which plans are based obviously must remain confidential. Moreover, military plans are never disclosed to any outside agency and thus civilian agencies must base their plan on reasonable probabilities. The exact schedule or calendar for the various stages of relief and rehabilitation must await developments but it is the job of the office to be ready when the time comes.

The formation of OFRRO under Governor Lehman has laid valuable ground work for United States participation in a United Nations program. Pending the creation and actual operation of UNRRA the work of OFRRO in the United States has paralleled that of the Inter-Allied Committee in London on behalf of Great Britian and the governments-in-exile. The extensive studies which have been made of relief requirements in different areas and the formation of plans for a relief program will all be utilized in an ultimate program in which the United States will contribute its share to the common objective.

How long we must continue relief after we liberate an occupied country we cannot tell, but the crisis in each area will end after the first good harvest. In the last war the reconstruction period ran from August 1919 to July 1923. Extensive child feeding was carried on in various countries for four years after the Armistice, but mass feeding began to diminish after the first harvest or even earlier in some localities.

To quote Mr. Lehman, formerly the head of OFRRO and now assigned by the President to new duties pertaining to the establishing of UNRRA:

> Because of the relatively short time in which we have been working to organize these measures, we as yet are only blazing the trails into this immense problem. But it already seems clear that the first measures will be strictly those of an emergency measure to stop starvation, to prevent deaths by exposure, to head off the terrifying threat of epidemic and pestilence. Behind those measures must come provision of seeds to get a new crop into the ground, because experience has shown that once crops have been planted and harvested in liberated countries the peak of relief operations has been passed and the populations once more can begin to help themselves. With the real threat of starvation eliminated, with people once again provided with the bare necessities of shelter and clothing, with commerce undergoing a new birth as the first crops come in, the men and women who have endured so much under the slave system of Nazis and their Axis accomplices will be able to draw their own plans for reconstruction of their institutions and their lives.

SOYA PRODUCTS—AVAILABILITY, NUTRITIONAL VALUES, AND UTILIZATION[1]

BETTY G. LEAMING
Associate Technologist, Food Distribution Administration

NEWS of soya this year takes a practical turn. Soya products, long extolled for their nutritional qualities, are now available to a nation-wide extent. For dietitians, this means a good supply of high-quality protein at low cost to include in healthful meals for the millions of Americans who eat in schools, hospitals, industrial cafeterias, and restaurants.

For domestic use during this next year, federal planned production sets aside at least 300 million pounds of soya flour, flakes, and grits, the basic soya products available for use in home and institutional recipes, as well as in commercial formulas for such prepared foods as pancake and muffin mixes, cereal products, macaroni and other paste goods, meat products, soups and breads. Production of soya is keeping pace with the demand and undoubtedly these products will be available throughout the year.

This year is an especially favorable time for the introduction of soya products on a large scale, for the country needs them nutritionally, and their utilization is a part of the National Nutrition Program. Wartime requirements for high-quality protein are great. Supplies of the longer-utilized high-quality protein foods, such as meat, milk, and eggs, although greater than ever before, have not kept pace with demands, and prices are high. In addition, funds to operate institutions, seldom liberal, frequently have not increased proportionately with the cost of living. Shortages, or at least inequitable distribution of high-quality protein have always been closely allied to wartime. So consistent has been this alliance that edema, developing primarily from lack of high-quality protein, has become known (1) as "war edema." This condition need not exist during this war period and the postwar adjustment period to follow, with the generous supply of soybean products available.

The 300 million pounds of soya products planned for domestic use represents about 140 million pounds of high-quality and low-cost protein, as well as substantial amounts of vitamins of the B complex and certain minerals, primarily iron, phosphorus, and calcium. This offers enough protein for a full year's requirement for more than two million people; or, used in small quantities in familiar dishes, such as bread, macaroni, and meat loaves, it will supplement many other incomplete proteins for millions more.

Soya will materially aid the war feeding program here and abroad. It is also a food which will remain as a staple long after the war. Its protein is of high biological value. It is a product which can be produced and distributed at a cost low enough to help meet the protein requirements of low-income families and for world-wide distribution on a competitive economic basis. Last, but not least, foods containing soya are delicious when properly prepared—sufficiently appetizing as to be accepted even in normal times.

SOYBEANS DISTINGUISHED FROM SOYA PRODUCTS

Soya products, a term used to include the flour, flakes, and grits, are on the market. It will be important for potential users to become acquainted with the proper ways in which to use these products in actual meal preparation. On the whole, they are easy to use; but like all new products, they require a suitable introduction. A review of some of the scientific findings concerning soya products may aid dietitians in using these most advantageously, thus ensuring their fullest utilization in the National Nutrition Program.

In the first place, the soya products have a more neutral flavor than do the beans themselves and can be incorporated easily and quickly into delicious dishes in combination with a great number of other foods. This one fact permits a wider utilization of soya protein through the use of these products than would the occasional service of whole soybeans.

Soya products are manufactured from specially selected and cleaned soybeans. They are of two types: first, those containing all the natural oil of the bean, and second, those from which most or pratically all of the oil has been removed. In the processing, soybeans are dehulled, debittered (to remove undesirable raw bean flavors), and heat-treated to make the protein readily available. (Uncooked soybean protein is not readily available.) Finally, the cake resulting from the processes which remove the oil is milled to size the product into flour, grits (often similar in particle size to corn meal), or flakes which resemble rolled oats, depending on the final intended utilization. In the manufacture of the low-fat products, the oil is either removed by an expeller process or is solvent-extracted. The various types of products have slightly different chemical analyses as indicated in Table 1 which shows the composition of the three types of flours.

TABLE 1

Average percentage composition of various types of soya flours

	FULL-FAT FLOUR	LOW OR MEDIUM-FAT (EXPELLER) FLOUR	LOW-FAT (SOLVENT EXTRACTED) FLOUR
	%	%	%
Moisture	5.5	5.0	7.0
Protein	40.5	50.0	52.25
Fiber	2.1	2.4	2.5
Ash	5.0	5.5	6.0
Fat	22.0	7.0	1.0
N.F.E. (non-starchy) material	24.5	30.0	31.25

CHEMICAL ANALYSIS OF SOYBEANS

The use of soybeans as such also is growing rapidly and the average chemical analysis of the soybeans of a year's good harvest indicates their excellent food value. Approximately 11 per cent of the bean is moisture, 19 per cent fat, 4.5 per cent ash, 4.3 per cent fiber, 37.5 per cent protein, 7 per cent sugars, 4.4 per cent pentosans, 12.3 per cent (by difference) nitrogen-free extract. From the point of view of nutrition, it should be pointed out that the ash of the soybean is decidedly alkaline in nature. Bailey, Capen and LeClerc (2) give the following figures for the mineral content of soybeans (air-dry basis): potassium 1.913 per cent, sodium 0.343 per cent, calcium 0.210 per cent, magnesium 0.223 per cent, phosphorus 0.592 per cent, sulfur 0.406 per cent, and chlorine 0.024 per cent. Morrison (3) reported that soybeans contain about 0.02 per cent iron and Sherman, Elvehjem and Hart (4) found that 80 per cent of the iron in soybeans is available to the animal organism. Soybeans also contain (4) substantial quantities of thiamin (274 to 446 I. U. per 100 gm.), niacin (4.77 to 8.99 mg. per 100 gm.) and riboflavin (300 to 400 mcg. per 100 gm.).

[1] Received for publication October 5, 1943.

PROTEIN QUALITY OF SOYA PRODUCTS

It is evident from Table 1 that soya products are highly concentrated in protein, even more so than soybeans. The high quality of soybean protein in regard to content of essential amino acids is indicated in Table 2. The value for lysine is that of Felix (5); for the other amino acids, Block and Bolling (6).

Since the specific biological purpose of each amino acid has not yet been definitely established, it is unwise from the standpoint of practical nutrition to depend entirely on amino acid analysis. Such an analysis at this time is only one indication of the protein quality, and as such should be checked against results obtained in biological experiments. Animal feeding tests, comparing the growth-promoting ability of soybean protein with other foods of established growth-promoting value, such as milk, have repeatedly substantiated its high quality as indicated in the essential amino acid analysis.

TABLE 2

Essential amino acid content of soybean protein

	%		%
Lysine	5.77	Methionine	2.0
Isoleucine	4.8	Histidine	1.8
Tryptophane	1.6	Leucine	7.7
Threonine	4.0	Arginine	5.3
Valine	4.5	Phenylalanine	5.7

TABLE 3

Cost of soya protein in comparison with milk, meat, egg, and fish protein (9)

	COST PER LB.	PROTEIN	APPROXIMATE COST OF PROTEIN PER LB.
		%	
Soya flour (low-fat)	$0.0425	50.0	$0.085
Soya flour (full-fat)	0.0590	40.0	0.143
Skim milk (dried)	0.1450	35.4	0.410
Whole milk (dried)	0.4500	26.9	1.67
American cheese	0.270	24.4	1.11
Salmon (canned commercially, red)	0.320	20.8	1.54
Beef, lean (utility grade)	0.175	21.3	0.822
Pork (ext. lean trimmings)	0.180	16.6	0.922
Mutton	0.120	19.8	0.606
Eggs (dried)	1.10	46.5	2.38

DIGESTIBILITY OF SOYBEAN

According to animal feeding tests, 86.2 per cent of the total dry matter of the soybean has been found to be digestible (7). With humans, coefficients of digestibility with soybean protein ranging from 85 (7) to 97 per cent (8) have been reported. Of course it is true that a coefficient of digestibility (9) in itself does not necessarily indicate the percentage of an ingested nutrient that is retained in the body proper (blood stream and elsewhere). More specifically, the coefficient of digestibility of a protein means little unless further substantiated by growth-promoting experiments.[2] In the case of soya, tabulations of comparative digestibility coefficients, amino acid analyses, and results of growth-promoting animal feeding tests all contribute to the conclusion that the protein of soya is of high biological value.

COST AND UTILIZATION OF SOYA PROTEIN

Established nutritional value, low cost as indicated in Table 3, and plentiful supply should mean heavy utilization of soya products.

[2] *Editor's Note:* A report of such an experiment, using soybeans among other legumes, will appear in a subsequent issue of this JOURNAL.

Both flour and grits are available to homemakers at present in retail stores throughout the country, in 1 to 3-lb. packages. The larger size package may be sufficiently large for many dietitians at first, and if there is sufficient demand, it is quite probable that some of the companies will put out a more suitable size container, perhaps one holding 25 lb. In the past, soya flour has been sold mainly in 100-lb. bags, but this is too large, of course, except for use in connection with very large food services. Soya products, like cereal products, should be kept tightly covered in a cool, dry place.

RECIPES ESSENTIAL AT FIRST

Soya flour and grits are used for protein fortification in such familiar foods as soups, breads, paste goods, meat loaves, gravies, sauces, and sandwich spreads. In the beginning, it is advisable to follow closely recipes which have been developed expressly for soya. The companies[3] retailing the products have done extensive work in recipe development, and it may be well to consult with them since they are anxious to cooperate. Some of their work has been on quantity cookery.

Also, the Bureau of Human Nutrition and Home Economics of the Agricultural Research Administration, U. S. Department of Agriculture, has recently published a concise, attractive leaflet, "Cooking With Soya Flour and Grits," which is a direct result of intense work with the various available soya products and contains 37 carefully tested recipes. The recipes are given in quantity for 6 servings, but many are easily adaptable to larger quantities. Some of them, modified for larger food service, were tested for acceptability among school children in a cafeteria, and passed with flying colors. Sandwich spreads were especially pleasing to the children and the management.

Women's magazines with national distribution have carried soya recipes recently which may be helpful for ideas. One other good source to tap for recipe suggestions is the Soy Flour Association.[4] It is essential that tested recipes be followed when starting to use soya products, for the correct amount of soya must be used in the right way. After using these products for a time, the cook becomes accustomed to the "feel" of mixtures containing soya and may then reach the point of being able to add automatically the right amount, just as the seasoned cook often scorns formal recipes for many of her choicest dishes.

Soya products used in various mixtures, as the Bureau of Human Nutrition and Home Economics points out, take up more than the usual amount of liquid. Some of this may be lost, particularly in baked products. This one characteristic shows clearly the need for properly balanced soya recipes.

In various mixtures, such as meat loaves, slightly more seasoning may also be needed since soya is so very neutral in flavor. The meat and soya loaf, properly made, will be delicious in flavor, at least as high in protein value as the all-meat loaf, and in protein percentage and protein quality far superior to the loaf made with a combination of meat and bread crumbs or other cereal products. The caloric value of the meat and soya mixture, too, will far exceed that of the usual meat loaf, since soya tends to hold the fat within the loaf itself. Loaf shrinkage, therefore, is decidedly decreased. This fact was brought out clearly in experiments on canned meats and is considered of much importance in meat preparations for foreign shipment

[3] Archer-Daniels-Midland Company, Minneapolis; The Glidden Company, Chicago; Central Soya Company, Fort Wayne, Ind.; A. E. Staley Manufacturing Company, Decatur, Ill.

[4] Soy Flour Association, 3818 Board of Trade Bldg., Chicago.

where it has become increasingly necessary to utilize every bit of ship space with foods of high nutritive value.

Scrapple is another part-meat product in which the addition of soya greatly improves the protein quality and the palatability. Soya protein will definitely supplement the important but lower-quality protein of corn meal. Scrapple containing soya will brown more quickly, as will sausage with soya, corn-meal-soya mush, or fish and potato cakes with soya.

Bread puddings, custards, soups, stews, breakfast cereals, muffins, and bread are other foods which may well be fortified with protein by the inclusion of small percentages of soya. Soya flour, used in bread mixtures, cannot replace more than a relatively small amount of the wheat flour since it does not contain the necessary gluten common to wheat flour. Three parts soya flour to 100 parts wheat flour can be used without altering the appearance or flavor of white bread, and 10 per cent can be used without any great change in color or flavor. Yet these small percentages do an excellent job of protein fortification and supplementation. The inclusion of 10 per cent soya triples the protein efficiency of patent wheat flour. Wheat flour is low in lysine, an essential amino acid. Adding soya, high in lysine, therefore materially supplements the protein of wheat. This may be of special importance in the many institutions where bread plays even more than its average role in the American diet.

The lysine supplementation principle of soya and wheat holds true also when soya is one of the ingredients of macaroni and other paste goods. Currently it is felt that commercial use of 10 per cent soya flour in paste goods is practical from a manufacturing standpoint, and it is known to be more than practical from the standpoint of nutritional needs. If this percentage is added to only one-half of the total national production of such products, American diets will gain 25 million pounds of high-quality protein. The protein efficiency of this amount of soya flour, allowing for the increased efficiency of the wheat protein, in all probability would be that of 50 million pounds of additional protein.

In its efforts to distribute soya widely because of its potential nutritional benefit, the Food Distribution Administration is encouraging food manufacturers to use soya. Some manufactured products containing soya are available now. More will be available at an early date if dietitians ask for them. If these totally new products are to have the widest possible distribution they deserve, the cooperation of all those who recognize their nutritional value is required. Creating new markets is difficult at best. Products must be on the market before they can be tried. Yet a certain demand must be created in advance before manufacturers, especially under the current manpower conditions, will spend the time, money, and effort necessary to change their established production lines and do a thorough merchandising job.

There are and have been complaints about the difficulty of obtaining soya products. At first it was because they were quite impossible to obtain while at present people complain because all types of foods with soya are not readily available in all stores in all localities. Some of such complaints are just; but just or unjust they are welcomed by those earnestly trying to make soya more readily available. The complaints will be doubly appreciated if they are constructive—if they become repeated requests for soya products through the normal food supply channels. For example, this strategy may effectively speed much wider production of a potential soya product, paste goods, which is already popular and could easily be fortified with soya if demand were sufficient. Macaroni and spaghetti, thus made, would have improved flavor and texture and high-quality protein—excellent for a one-dish school lunch or institution meal.

Practically all soups can be fortified with soya in sufficient quantity to make them good protein foods. This may be done in the institution kitchen or in the mixers of soup plants. Real strides have been made this year in improving the palatability of soups containing soya, and tremendous amounts of these dry soup powders are bought for foreign shipment. They are outstanding for good flavor, low cost, nutritional value, ease of preparation, and saving in cargo space. Some have been effectively fortified with vitamins of the B complex through the incorporation of combinations of yeasts. Reports from Russia and England indicate that these soups have become very popular and are in great demand by our allies. The several suppliers of these soups may be able to utilize part of their production lines for domestic utilization if requested to do so.

Most of the soya soup powders have been of a pea-soya type with one ounce of the powder sufficient for a cup serving of soup. The approximate composition of this powder is: moisture 8 per cent, protein 28.5 per cent, calories per gram 3.4, thiamin 2.5 to 3 I.U. per gram, and riboflavin 3.5 to 4 mcg. per gram. Fortified with yeast, this soup powder contains 257 I.U. thiamin per ounce, or approximately 45 per cent of the daily requirement for the moderately active man; and 275 mcg. riboflavin per ounce, or approximately 10 per cent of the daily requirement.

Experimentation shows clearly that, though slightly more expensive, a great variety of soup powders made with soya and having excellent flavor may be produced. Among these are borsch-soya, potato-soya, spinach-soya, and carrot-soya soups, and fish-soya chowder. A mixture has been developed combining various ingredients, including cheese and soya, which makes an excellent cheese-flavored soup, sauce, or spread. It is prepared for serving simply by adding water and bringing to a boil. It will not lump, no matter what you do, according to those who have tested this product. There is also a stew-like mix, containing various available foods including soya, which closely resembles Italian minestrone even though it contains no meat. The formula for this dry mix was developed especially for use in the feeding of the reoccupied countries of Europe, where extreme protein deficiencies could materially affect many peoples of the postwar world. However, though available only for foreign distribution at present, the product definitely seems applicable for domestic consumption. More information about this product and possible suppliers can be obtained from the Food Distribution Administration.

SUMMARY

In brief summary, basic soya products, at least 300 million pounds of them, are available this year for use in homes and institutions, and by commercial food mixers. They are available now, though they cannot always be found in all forms on every grocer's shelf. If the demand is sufficient, the supply and variety obtainable should be adequate. Their excellent nutritional qualities have been confirmed by indisputable evidence, and their full utilization is merited. The readiness with which they are accepted will depend to a large extent on the interest shown by dietitians and others whose chief concern is with nutritional qualities, dietary needs, and costs.

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OUTLOOK FOR FOOD SUPPLIES

It is my firm conviction that no group in America concerned with food and nutrition and large group food services has contributed more to the war effort than the American Dietetic Association. . . .Every bit of knowledge as a result of work done by the members of this Association in the last fifteen years is being used today to great advantage in the war effort. . . .And through a kind providence, we have been blessed this year with a bountiful supply of food of all kinds. We will harvest an adequate supply of all grains for home consumption, for our armies and for foreign relief. Nowhere else in the world does there exist a supply of food that would represent more than a small fractional part of this great American bread-basket. Despite this bountiful supply of food, we are confronted on all sides by shortages. . . .Garden vegetables have been in such abundance all season that when the canned supply of these is totaled, we will have a figure vastly greater than for any amount previously packed in one season.

In the case of fruit, we find that although there is a fair crop, the inadequate supply preserved through canning and dehydration results in a net shortage that must be felt acutely before another season's pack is ready for the market. Despite the fact that only 50 per cent of the amount of fruits available was canned, the Government took the same quantity as it did in 1942, leaving very little for the civilian market. The management of the fruit supply, particularly berry fruits, was badly bungled by the OPA; this will result in a grave shortage of these fruits for the commercial manufacture of preserves and jellies. Because no price was established for some frozen fruits by the OPA until long after the growing season had ended, this important market at present is paralyzed. It is not necessary for me to state here the prices at which all fresh fruits were sold in the metropolitan markets.

Today we are confronted not only with a shortage of oranges but with a price for the common juice orange that has risen to 60 cents per dozen in our own local market. In some markets no oranges are to be had at any price. According to recent newspaper information, more than 800 million oranges have been shipped abroad. Our American babies are daily in need of orange juice. It seems to me that sufficient oranges should be provided, at least for our children, and at a reasonable price, before they are shipped abroad . . . Some day soon, we may awaken to find our warehouses filled with stores of food large enough to supply this country for some little time after the war. It will be very difficult to hold prices at their present level in the face of this surplus.

The control of the vast majority of the food in this country could be accomplished through the regulation of some eight or ten major items. The present method aims to control everything from artichoke hearts to yams. The burden of recording and reporting all this imposes an extra and heavy task at a time when all of us are confronted with a shortage of labor. Food merchants are so hampered by useless red tape that many are liquidating their businesses. We are fighting a war for freedom. Yet to accomplish this, it is sardonic to note that we are adopting every form of regimentation that tends to destroy private enterprise and removes individual incentive, both of which are essentials of that free society which has been the cornerstone of the development and expansion of our great nation. . . .I see the women of our country as our real strength in the present emergency. I know that when the time is right, they will act to preserve this great nation as the land of opportunity where their children and their children's children may continue to enjoy its blessings.—*Excerpts of an address by Sherman J. Sexton, President of John Sexton & Company, Chicago, before the American Dietetic Association, Pittsburgh, October 21, 1943.*

FOOD IN 1944

Sometimes unthinking critics say, "With all this vast food production, all these supplies, why have rationing? Why not let American people buy all the food they want?" Here is one reason: Our national income is now estimated at 140 billion dollars per annum. It was less than 40 billion in 1932. That means a lot of extra money to spend. . . especially since the transforming of our great automobile factories, our steel plants, our great manufacturing concerns for wartime production has greatly reduced the number of other articles which the American people can buy. There couldn't be enough food for all that spending power. I have even heard some people from the cattle producing areas say, "Why not bring the cattle to the market and let the people have all the meat they want?" With this great surplus purchasing power people would soon consume the available supply of meat and we would have a real shortage. Oh, this could be done. We could have a Belshazzar's feast for a few months—and then this would be followed by a real shortage, a shortage not only for people on the home front but—what is even more tragic—a shortage for our own soldiers and for our allies. . . .If in our unthinking moments we indulged in such a saturnalia as this, then a higher power than mine or yours would be justified in writing on the wall, "*Mene, Mene, Tekel, Upharsin*" ("Thou art weighed in the balance, and art found wanting.") If we did this, I am sure the soldiers when they come home to meet us again would feel that such a handwriting would be justified.

If we are wise we will arrange for the Army and the Navy to stockpile some of these increased meat supplies this fall and winter to be used a few months later when the slack marketing season comes. . . .We will not have all of everything we want or are able to buy, but on the whole the American people will have plenty of good wholesome food. We are planning all-out food production to meet the needs of all-out war. There will be no restrictions on food production. After consultations we are having with farmers in states and counties throughout the nation, goals will be established and farmers will be asked to plant as much of the vital war crops as they can. We shall assist them in every way possible to obtain machinery and supplies, fertilizer, credit, labor, and other essential needs. The tremendous demands of war will create difficulties, but the farmers themselves are trying in every practical way to help solve these problems, and we believe that our tremendous food production will be continued in spite of the many difficulties which face us.—*Excerpts of an address, part of which was broadcast over the Blue Network, by Judge Marvin Jones, War Food Administrator, before the Association of Land Grant Colleges and Universities, Chicago, October 26, 1943.*

NUTRITIONAL PROBLEMS OF ARMY OVERSEAS RATIONS[1]

MAJOR VIRGIL O. WODICKA, Q.M.C., U. S. ARMY
Subsistence Research Laboratory, Chicago

KNOWLEDGE in the field of nutrition has advanced with giant strides in the last generation. The vitamins have been discovered, many of them have been synthesized, and their study has led to developments in other fields, related and unrelated. Our knowledge of biochemistry and physiology has certainly been furthered by studies of the enzyme systems related to vitamins of the B complex. Colorimetric estimation of the carotenoids has entailed so much difficulty in matching yellows in visual colorimeters that the development of photoelectric instruments has undoubtedly been accelerated. Another factor in this development has been the necessity for measuring fleeting colors such as are obtained in the Carr-Price reaction for vitamin A. Now that these instruments are available, of course, they have been put to a wide variety of other uses. Chromatographic techniques developed for study of the carotenoids have been applied to many other investigations in organic and even inorganic chemistry.

Progress in the vitamin field has been accompanied by less spectacular but fully as important advances in our knowledge of trace minerals and of amino acids in their relation to diet and well-being. Many of the fundamentals of sound nutrition which we take for granted today were entirely unknown and even unsuspected a generation ago.

CALORIC REQUIREMENT A FIRST CONSIDERATION

Paradoxically enough, in military subsistence, these recent epoch-making advances are distinctly secondary in importance to a fundamental nutritional principle which must have been at least suspected by the cave man—namely, that a man must have enough to eat. In Army rations, the calorie takes precedence over the microgram.

This order of priority has not been established by fiat or even by a conference of learned men. Repeated tests, both in physiology laboratories and in the field, have shown that a deficiency in calories results in impaired performance and poor morale more quickly and more markedly than a deficiency of any specific nutrient.

The mere recognition of calorie supply as the problem of first importance, however, is only the first step. Any attempts to solve that problem lead immediately to a series of corollary problems of food technology, logistics, tactics, psychology, and a long list of other fields. While these related problems are not strictly nutritional, they are so inextricably bound to the primary nutritional problem that discussion of them here seems warranted.

One fact must be borne in mind in discussing calorie supply: a calorie cannot be considered as supplied until it has been utilized by the soldier. To illustrate with an extreme example, a lump of coal has many attributes of the ideal emergency ration and can supply thousands of calories—but not to the human organism. While coal has not yet been seriously proposed for Army subsistence, some of the suggestions which have been submitted have betrayed enough ignorance of the facts of life for us to await the day when such a proposal will be made. Until that dismal day, we must remember that digestibility and assimilability must not be sacrificed for stability and concentration.

IMPORTANCE OF ATTENTION TO TASTE PREFERENCES, EASE OF PREPARATION, AND VARIETY

Considering now the chain of calorie supply, and remembering that this chain extends from the farms and feedlots to the soldier's blood stream, we find that one of the weakest links occurs between hand and mouth. One reason for the weakness of this link is a second fundamental fact relating to subsistence: a normal soldier who is not in dire need of food will not eat food he does not like, even though his refusal results in calorie deficit. This fact has been repeatedly demonstrated by laboratory and field tests, by experience on maneuvers, and by the reports received from the actual combat areas.

Both civilian and military experience have shown that foods which differ widely in flavor from the dishes to which a people is accustomed will find poor acceptance. This means that rations for our Army, to be nutritionally effective, must conform as closely as possible to American taste habits. This necessity poses serious technological problems in any attempt to introduce new foods such as the economically attractive and nutritionally desirable soybean. Soybeans can be used in the rations only in ways which do not alter the basic flavor of the foods into which they are introduced or in dishes which closely resemble in flavor the nutritional equivalents which they replace. The present use of soybeans in Army rations is limited because of these flavor problems, which have been thrust upon the American food industry too recently for the solutions to be yet at hand.

In addition to conforming to American taste preferences, foods for Army rations should be easily prepared. A cook who is unimaginative or uninterested in his job or who is operating under particularly unfavorable circumstances will serve the food with a minimum of preparation. If the food is unpalatable when so served, it will not be eaten in sufficient quantities, and the troops will be inadequately nourished. This situation becomes particularly acute with those rations which are intended to be cooked by small groups of men with improvised cooking facilities or which must be handled by each individual soldier for himself. If you doubt whether a man will discard food rather than expend what he feels is a disproportionate amount of time and trouble in its preparation, ask yourself whether you prepare for yourself alone the same menu which you would serve to your whole family. Rations for individual men or for small groups are issued when the tactical circumstances require dispersal of the forces. It is precisely under these circumstances that the men will have least time available to devote to food and that they will be exhausted to the highest degree by their other activities. The smaller the preparation unit, therefore, the more easily prepared the food must be. Rations issued to men for individual preparation and consumption must all be edible and palatable with no preparation at all.

Another prerequisite for acceptability in a ration is variety. This statement will probably go unquestioned when it is applied to food eaten in camps and permanent bases. It has, however, been seriously questioned with regard to combat rations for the individual soldier. The idea of a single conglomerate food material, nutritionally complete, stable, and compact, has occurred to a great many people as the ideal ration to be carried by the soldier for use in combat. About every two months, such a ration is suggested from some new source; frequently with samples, and usually with calculations. The Army has not overlooked this possibility nor brushed it aside lightly. Nutritionally, such a preparation is feasible, and the technology is not too difficult. Here again, the slip is between the cup and the lip. These preparations, which are frequently soups or gruels, may reach the soldier's cup without insurmountable difficulty, but they will seldom get past his

[1]Presented before the American Dietetic Association, Pittsburgh, October 21, 1943.

lips for more than one or two days successively. Repeated field trials have shown that even very cooperative subjects will show caloric deficits severe enough to interfere with their performance, to say nothing of morale, before the end of the first week on such a ration. Even though the food may be palatable at the start of the test, the subjects are unable to stomach enough of it after the first day or two to meet their energy requirements. To our knowledge, this is the invariable result of such tests.

It may be further pointed out, however, that the experience of exploring parties shows that the men will eventually become accustomed to a ration which at first is unpalatable, if nothing else is available. The difficulty from the Army standpoint is that only an infinitesimal percentage of tactical operations will last long enough for this accommodation to take place. The period of revulsion and lost efficiency is just the period covered by the normal mission when combat efficiency should be at its peak. The fact that such a ration may have a long list of specific nutrients present in carefully and even competently calculated balance, therefore, bears no relationship to its actual nutritional effectiveness. It fails in the primary requirement of furnishing enough calories. It is probably significant in this regard that no modern army has successfully used such a ration. Attempts made by some foreign armies to use a highly simplified ration of two or three components have met with signal failure for the same reason.

It may, therefore, be taken as established that any ration to be consumed for a period longer than two days must provide variety in order to be nutritionally sound. The variety available to an army in the field, however, is limited by logistic considerations. Every additional item in the list of ration components adds to the difficulty of transporting, storing, procuring, and subdividing for issue of the ration. When the supply problem becomes too complicated, the whole system breaks down, and the resulting confusion makes it impossible to obtain the variety in the ration which causes the trouble. The number of items in the ration must therefore be a compromise between the opposing desires for variety in use and simplicity in supply.

THE PROBLEMS OF TRANSPORTATION AND PRESERVATION

Difficulties of supply necessitate compromises with other principles of good subsistence practice. For one thing, lack of sufficient refrigeration facilities for storage and transportation of large quantities of perishables makes it necessary to ship almost all foods to overseas troops in nonperishable form. The processes necessary to effect preservation of these foods cause some loss in flavor, thereby diminishing in varying degrees the acceptability of the various products. Soldiers in overseas areas frequently mention their longing for fresh foods. Despite exploitation to the utmost of all facilities for supplying fresh foods, such items cannot comprise more than a small fraction of the total ration except in fixed bases like England and Australia, where there is an appreciable local supply.

Not only is there a distinct limitation on the supply of foods which are normally considered perishable, but the length of the supply lines and the severity of many of the climates in which we are operating bring into question the propriety of designating any foods as really nonperishable. We must now support large armies in regions which have previously supported only small populations, and those populations have not only adapted their taste habits to the foods of the region but have also been able to subsist largely on current food supply without the necessity for food preservation on a large or organized scale. There has been essentially no export food business to these regions in normal times, and the climatic extremes encountered do not occur to such a serious extent in this country. Where they have been encountered domestically, they have largely been circumvented by the use of refrigeration or by rapid turnover of food stocks or both. The necessity for supplying foods in accordance with American eating habits to large bodies of men in these unfavorable climates overseas has posed problems in the behavior of foods under these conditions—a study not required of our food industry until now.

It has been necessary to draw on the combined experience of the whole food industry and to supplement this with conjecture in order to postulate the probable effect of unfavorable storage on both the flavor and the nutritive quality of foods. Active experimental work is now under way on all types of foods to fill the gaps in our knowledge. Within the next year, it will be possible to predict with much more accuracy the behavior of foods in storage in all climates. In addition to the studies of industry and of our universities on the individual foods, actual tests of rations stored in the open have been conducted by specialists associated with the Research and Development Branch of the Office of the Quartermaster General, to try to establish a correlation between recorded weather observations and the temperatures reached by foods of various types stored in various ways. In the absence of information of this kind and of direct experience with our foods in severe climates, the fact that there have been very few serious mistakes made in choosing foods for overseas shipment is a tribute to the soundness of judgment of the technical people in our food industry and to their willingness to contribute their knowledge and advice to those of us in the Army who are concerned with these problems.

Deterioration of foods in unfavorable climates, especially in hot climates, may come about in several ways. First of all, the food container may be damaged or destroyed by too much exposure to the weather. This, when it occurs, can result in complete loss of the food through dissipation or spoilage. Insects and rodents can also destroy the containers, and, of course, the inevitable rough handling in forward areas is even more destructive. The use of non-metallic containers wherever possible because of shortages of tin and steel makes packaging problems particularly difficult.

A second way in which unfavorable climates can affect the foods is by actual food spoilage. Times and temperatures of storage in this country are such that any thermophilic bacteria present in foods will not normally cause trouble. This cannot always be said of conditions overseas. Extra precautions must therefore be taken in the preparation of foods for overseas shipment. Bacteriological control of food processes must take into account more types of organisms. Chemical spoilage, of course, is also a more important factor at high temperatures. The hastening of reaction rates by heat causes off-flavors to develop more rapidly as well as accelerating changes in color and texture of the products. Since the calorie value of the rations supplied is diminished by whatever proportion of the food is lost by damaged containers and by bacteriological and chemical spoilage, these technological problems also become nutritional problems.

Long storage at high temperatures has a third undesirable consequence which is closely associated with chemical spoilage. Even though the food remains edible and cannot be considered spoiled in the usual sense, the chemical reactions, accelerated by heat, may seriously diminish the nutritive quality of the food. Although the primary emphasis in military subsistence is on calories, we cannot afford to neglect the various specific nutrients. Loss of

minerals, of course, is negligible except for those foods which, before they are eaten, must be soaked or parboiled in water which is then discarded. Fortunately, there are few foods which must be processed in such a way for preservation that this type of treatment in the kitchen is necessary. Deterioration in carbohydrates and fats is not usually serious except that fats may become rancid. This is a deterioration in flavor more than in nutritive value, and so long as the product remains edible, it need not cause great concern. This does not mean that the potential rancidification of fats is ignored. There is a great deal of active research on the prevention of this reaction in all types of fatty foods.

The effect of unfavorable storage on proteins is less well known. There is, however, an ample supply of protein of good quality in all Army rations, and what knowledge we have of the subject, coupled with the results of field experience to date, would tend to indicate that we have not yet encountered any serious problems with proteins.

This leaves the vitamins as the specific nutrients on which storage under unfavorable conditions has most effect. For this reason, the Army has given more attention to vitamin problems than might at first seem justified. The recency of development of methods of quick and accurate analysis of foods for vitamins has prevented the accumulation of a sufficient body of data for judgments to be rendered on vitamin stability, based on previous knowledge or experience. This is particularly true for foods processed by techniques, such as dehydration, which were little practiced before the war. Ascorbic acid, carotene, vitamin A, and thiamin are particularly unstable, and their stability in a given type of product may show wide variation due to differences in processes of preservation.

VITAMIN STABILITY AND CALORIC CONCENTRATION

Vitamin stability problems are met in several ways. First, every attempt is made to plan diets with a large enough margin of safety in vitamin content to be adequate, even after considerable loss. Since this is not entirely possible with unfortified foods, vitamin enrichment is used in some foods which are widely used or which are particularly good carriers. The two most widely used foods with vitamin supplementation in Army rations are enriched flour and synthetic lemon juice powder. Enriched flour needs no further comment, but the lemon juice powder deserves some elaboration. This product is a mixture of dried lemon juice with dextrins, dextrose, citric acid, oil of lemon, and ascorbic acid. It makes a palatable lemonade and is the most stable carrier of ascorbic acid we have yet examined. Soldiers have reported it helpful in covering the undesirable flavors of chlorinated water in the field.

In cases where the nutritional balance of the ration is too badly upset by difficulties of supply, vitamin needs can be supplied by tablets or capsules which are carried by each medical officer in the field. Although supply of vitamins in this way is satisfactory for limited periods of disturbed ration supply, it is not deemed sound practice to forget about the vitamin content of the rations and to depend routinely upon vitamin supply by tablet. Such a program would be unreliable both because the vitamin requirements of man are not yet fully known and because many men object to taking any type of tablet or capsule. It appears safer, less expensive, and conducive to better eating habits to supply the vitamins in foods, even though some fortification is necessary.

The desirability of supplying vitamins in foods leads to another interrelationship of factors in ration planning which has been mentioned before and may now be developed further. The need for vitamin-bearing foods can only be met with a varied diet. As we have seen before, such a diet is also desirable for reasons of acceptability to the soldier. Another kind of variety in food types selected to make up rations is made desirable by differences in climate. Not only does climate have a potential effect on nutrient balance in the foods, but it also affects texture and poses markedly different requirements on packaging for food items going to different regions. If, then, we are to have many different types of food to provide palatability and nutritive balance, and several modifications of each type to meet best the requirements of different climates, it may readily be seen that the ration soon becomes so complicated that the supply problem grows hopeless and ends up in chaos. One of the principles of warfare is that a plan must be simple to be successful. The principle applies to the plan of supply as well as to the plan of battle. This demand for simplicity sets the limit on the number of modifications of basic food types which can be made for climate.

A final point about which a balance of factors must be struck concerns concentration. Other things being equal, that ration is most effective which is lightest and most compact. The first and most obvious step to take in conserving weight and space is to remove all inedible portions of food materials and transport only the edible remainder to the troops overseas. From here on, however, every step effects a reduction in palatability or ease of preparation or both. In examining this further, we may consider separately caloric concentration (calories per unit weight) and caloric density (calories per unit volume) as indices of the properties desired. Caloric concentration can be increased by removing water and by increasing the proportion of fat. The greatest increases in caloric concentration gained by removal of water, obviously, come in those products which are normally high in moisture. Few such products are particularly palatable without reconstitution to a moisture content approaching the original. Dehydration, therefore, increases caloric concentration at the expense of some ease of preparation.

Improvement of the caloric concentration by increasing the percentage of fat, of course, stems from the fact that the caloric concentration of dry fat itself is two and one-fourth times that of dry protein or dry carbohydrate. Within certain limits it is an effective and desirable procedure. Starting with a food essentially zero in fat content, addition of fat will at first improve the palatability and texture as well as the caloric concentration. This trend will, upon further addition of fat, eventually reach a maximum for palatability, and while further addition of fat beyond this point will still improve the caloric concentration the resulting food will nauseate a man with the food habits of the average American. The point at which fat addition must be stopped to avoid nausea and other digestive disturbances is quite uncertain and much discussed at the present time. Further research on this question is needed.

Caloric density can be increased either by increasing the caloric concentration or by increasing the actual physical density (weight per unit volume) of the product since caloric density is the product of these two factors. The outstanding means of increasing the density of a food is to remove the air which is between or entrapped in the particles of the food material. An example of such an operation is the compression of dehydrated vegetables. Most of such increases in density, however, are attained at the sacrifice of some ease of preparation or desirability of texture.

In its grosser aspects, increasing density consists of using more efficiently the available space. By boning and

trimming beef at the packing plant, the meat can be packed in boxes for shipment. Meat handled in this way occupies less than 40 per cent of the space occupied by its food equivalent in carcass beef. In like manner, the design of packaging and packing has more to do with the caloric density of the finished assembly of many foods than any properties of the product. Alteration of packaging or of packing to improve the efficiency of space utilization does not usually impair the product in any way. The only difficulty with this means of improving caloric density is that it is usually impossible without retooling some large section of the food industry. With the present scarcity of materials and labor, this is almost always impossible.

To sum up, then, Army rations, to be nutritionally adequate, must be varied, palatable, stable, easy to prepare, concentrated, and easy to supply, as well as easily digestible and complete with respect to specific nutrients. The nature of the compromises reached between those requirements which seem imcompatible is best indicated by a brief consideration of the existing ration system.

CONTENT OF CURRENT ARMY OVERSEAS RATIONS

In fixed and semi-permanent establishments overseas, meals are prepared in field kitchens, and the ration used is Field Ration B in which foods are supplied in bulk and must be distributed to the using organizations on the basis of the number of men in the organization. This entails a certain amount of calculation and checking of lists and the maintenance of varied stocks at storage points. The ration contains over 100 different components and is supplied on the basis of 10 daily menus which are used in rotation. Two basic sets of menus are used, one for frigid regions, the other for temperate and tropical regions.

When complications of supply are too great for the supply of Field Ration B, or in situations where the men are dispersed in small groups without access to kitchen equipment, the 10-in-1 Ration is used in which all the materials necessary to provide meals for 10 men for one day are assembled into a single shipping case. Subassemblies make it readily possible to divide this main assembly into 2 smaller units for 5 men each. The foods in this ration are specially selected or designed with a minimum of equipment for preparation by men who have little cooking experience and who will devote little time or attention to the preparation of meals. Five different menus are provided for use in rotation. There is enough internal variety in each assembly so that the ration will not become too monotonous over a period of a week or more if, through some mischance, only one menu is supplied.

When tactical conditions require the men to be so widely dispersed that they cannot assemble in groups even as small as 5, or when there is insufficient time to prepare a varied ration, Field Ration C is supplied for individual heating with each meal made up of the contents of 2 cans. In one is the main dish of the meal, either meat and vegetable stew, meat and vegetable hash, meat and beans, meat and spaghetti, or English type stew; in the other are biscuits, confection, a beverage concentrate, and, often, cigarettes. The meat dish can be eaten cold but is much more acceptable when heated.

When tactical conditions are such that it is virtually certain that the men will not only have to eat individually but will also have to eat the food just as it comes from the package, without heating, Field Ration K is used. In this ration, each meal, which is packaged in a box about the shape of a brick and just a little smaller, contains a protein component (an egg product for breakfast, a cheese product for dinner, and a meat product for supper), 2 packages of biscuits (any 2 of 5 different types), a package of confection, a beverage concentrate, chewing gum, and cigarettes. Each component is separately wrapped, not only for ease of assembly in production of the ration, but also because this ration is frequently used in combat, when the soldier may not get a chance to eat the whole meal at once. The separate wrappings keep the uneaten components clean until use. It will be noted that there is some overlapping between the tactical functions of C and K rations. This has not been found undesirable, since the men have been known to tire of either one alone and welcome a change from one to the other.

The final ration, used only in cases of extreme emergency, is Field Ration D, a 4-oz. bar of specially fabricated chocolate. This has been chosen for its stability, caloric density, and relative palatability, and is intended only to supply calories without serious regard to nutritive balance. It is the only true emergency ration used by our ground forces and is not intended for use for more than a day or two.

These, then, are the Army rations now in use. Each represents a different compromise between opposing considerations, the point of compromise in each case being determined by the tactical situation contemplated. The ration system is by no means immutable, but is, on the contrary, in a state of constant flux. As reports come in from the combat areas, changes are made, sometimes sweeping changes. It is not possible to solve all the nutritional problems of our large Army from a laboratory bench in Chicago or a desk in Washington. It is our conviction, however, that we have not only the best-fed army in the world, but the best-fed army in history. We mean to keep it that way.

Food Changes Due to the War

Dehydrated cheese, mixed with potato flour and compressed into blocks, was among the new forms of food mentioned by Sir John Bodinnar, commercial secretary to the Ministry of Food, in describing the saving of precious shipping space by "putting food into battle dress." Last year we saved 41 million cubic feet of space by importing boned, molded and telescoped carcasses of meat, 22½ million cubic feet by importing dried instead of shell eggs, 1 million cubic feet by importing milk powder instead of canned condensed milk. These figures represent a saving of 750,000 ship tons. Other developments were a more compact form of importing bacon from the United States by using bales instead of wooden boxes, and using chests made of jute fiber instead of plywood for importing tea.

This season for the first time peas are being dehydrated. They keep well and are less bulky than canned peas and therefore more economical to transport. . . .Like dehydrated cheese, their production so far is earmarked for the fighting forces. So also are dehydrated potatoes prepared by a new process. All these new methods of treating foods have been introduced as part of the war effort but have considerable postwar possibilities.—*Foreign Letters, J. A. M. A. 123: 162, 1943.*

PRELIMINARY STUDY OF CONDITIONS AFFECTING THE NUTRITIVE VALUES OF DEHYDRATED VEGETABLES[1]

H. P. STEVENS, PH.D.
Research Department, American Can Company, Maywood, Illinois

DURING the 22 months which have elapsed since the entry of the United States into the present war the problems involved in the preservation of food by dehydration have received study and attention. With respect to concentration and perseverance, these studies have seldom been duplicated in the food processing field. It was quite natural that attention should have been directed first to the many and difficult problems of engineering, equipment, procedure, and operation. But more recently an increased and increasing amount of study has been directed toward the evaluation of the dehydrated foods themselves in terms of their nutritive qualities. The next step in this development, growing out of these studies of nutritive values, is the determination of ways and means for eliminating the causes of loss of nutritive elements and, in general, improving the status of the dehydrated products as food.

We must assume that if dehydrated vegetables are being purchased for use by our armed forces, our allies, and by the liberated peoples, they are intended to provide something more than mere variety of flavor in the crude fiber intake. Vegetables—or at least the vegetables being so purchased—are not usually considered to be significant sources of protein and with the exception of potatoes, sweet and white, and some beets, are not concentrated sources of carbohydrates. It must be then, that of these vegetables, carrots, cabbage, beets, and rutabagas are desirable principally for their vitamin and mineral contents. According to various governmental agencies, onions are desired chiefly as a source of flavor, but any food values which can be found and preserved in the onions will be highly valued. The fact that white and sweet potatoes are important sources of carbohydrates should not obscure their value as sources of vitamins as well.

REFERENCES TO LITERATURE

A number of workers in this field have reported on the vitamin content of dehydrated vegetables. Naturally, they have discovered a good deal concerning the conditions and operations which cause decreases in vitamin potency in these foods, and in some instances at least, have pointed the way, either directly or by implication, to avoid or minimize such losses.

Chace (1) has reported that the ascorbic acid and carotene content of dehydrated vegetables decreases during storage and that packaging in vacuum or in an inert gas assists in the retention of these two vitamins. Tressler (2) has also noted a considerable loss of ascorbic acid and carotene during storage of dehydrated vegetables. The ability of enzymes to destroy or catalyze the destruction of ascorbic acid and carotene has been reported by both Davis *et al.* (3) and Cruess and Joslyn (4).

Moyer (5) recognizes enzymes, blanching, drying, storage, and cooking as factors or conditions affecting the retention of vitamins. He reports that very little carotene is lost during the processing period but that the loss becomes appreciable and finally very rapid as the temperature of storage is raised above -40°F. Storing in an atmosphere of carbon dioxide reduced the rate of loss. Thiamin is sacrificed to some extent (depending on several circumstances) during preparation and blanching, but not thereafter. Only very small amounts of ascorbic acid remained by the time the food was actually dehydrated.

All of these results were well substantiated by Beardsley *et al.* (6) who studied the effect of type of packaging and of storage for 6 months on the vitamin activity of 14 dehydrated vegetables. In this study it was found that the reaction, or susceptibility to various conditions, varied somewhat between the various vegetables.

Nagel and Harris (7) among others have indicated the fate of thiamin and ascorbic acid during cooking and holding at high temperatures. They found losses exceeding 95 per cent with regard to vitamins B_1 and C under restaurant conditions. When one considers the conditions under which dehydrated foods will have to be prepared and served in army camps, communal mess halls, and emergency feeding kitchens, these figures become very significant.

Unfortunately, the literature concerning loss or retention of other nutritive factors in dehydrated foods is less complete. However, Rice and Lang (8) have found that from 5 to 25 per cent of the soluble solids may be removed in blanching. This, plus the subsequent loss in cooking, may amount to 65 per cent or more of the solids. At the same time, volume reduction during the conversion from fresh to dehydrated to reconstituted material may not exceed 35 per cent. Thus, it is possible that an ordinary serving of reconstituted dehydrated vegetable may contain one and one-half times as much fibrous and insoluble matter and only one-quarter as much sugar and other digestible material as a volumetrically equal serving of cooked fresh vegetable.

PLAN OF STUDY

In view of the above reports and findings, we have felt that it is incumbent upon the food processing industry to devise ways and means of avoiding or minimizing losses of nutrients, so that this country and our allies may, during the period of emergency at least, and we trust thereafter, benefit by the undoubted advantages offered by dehydrated vegetables, without having to pay the price of nutritional inadequacy.

Our plan in making this preliminary study or reconnaissance is first to get as clear a grasp of the problem as possible and then to review the experiences of others who have dealt with various phases of the problem. This, we trust, we have done as indicated very briefly above. The next steps require a listing of the various conditions which will need to be studied, a selection of certain key or "strategic" conditions for more detailed study, a prosecution of that study and a report of what we have found, together with our interpretation thereof.

EFFECTIVE CONDITIONS AND FACTORS

In listing the conditions which affect the nutritive values of dehydrated vegetables it is entirely possible that we may be omitting some items of importance. If that is true it is only because evidence of that importance has not come to our attention in the form of concrete data. On the other hand, we feel quite confident from our own experience and from a review of the literature, that the conditions or factors listed do affect the nutritive values of dehydrated vegetables. These conditions or factors are: 1. Variety of vegetable (within the species). 2. Source of the vegetable. 3. Condition of the vegetable at the time of processing. 4. Pretreatment or preparation procedures. 5. Blanching. 6. Drying. 7. Condi-

[1]Presented before the American Dietetic Association, Pittsburgh, October 21, 1943.

tions of storage. 8. Method and conditions of reconstitution. 9. Enzymatic activity at any stage of the procedure.

Obviously the original nutritive value of the raw product is the basic and over-all limiting condition. The nutritive values of the various species are known to vary both with the variety within the species and with the type of soil, climate, and other growing conditions attending the crop production. It has even been suggested that harvesting at different times of day may affect the quality and food value of some vegetables. This is the field of the horticulturist, and the horticulturist is diligently cultivating his field. Already much is known concerning suitability of different varieties of the various species for dehydrating. For example, Mahoney and Thompson (9) report on the "Maryland Golden" sweet potato, a variety which is superior in carotene content as well as possessing various other advantages. Caldwell *et al.* (10) report on the effect of variety and place of production in studying 18 different varieties of white potatoes grown variously in 7 different states—in some instances in different localities within a state. Caldwell and Culpepper (11, 12) have similarly reported on 34 varieties and strains of sweet corn, and 13 varieties of snap beans. Useful information of the same nature is now available in some degree for cabbage, carrots, onions, and beets. Rutabagas appear to have been neglected so far.

Given a highly suitable and nutritious variety of vegetable in its original or newly harvested state, it must be obvious that it is possible for the vegetable to deteriorate before processing. The studies of storage conditions for the raw product have been and are progressing. The problem here is chiefly one of keeping practice abreast of proved procedure.

The various necessary pretreatments such as peeling, cutting, washing and rinsing are possibly minor factors as far as loss of nutrients is concerned. Yet they probably merit some attention because in the course of these operations the vegetables are in contact with either air or water or both, and exposed nutrients which are soluble or oxidizable are therefore vulnerable. Perhaps the most important factors here are time and temperature since an increase in either one will not only tend to increase the possibility of solution and oxidation of nutrients, but also will favor the activity of enzymes about which we know little except that such activity is generally undesirable.

In blanching we have the first important operation which has been definitely incriminated as a cause of loss of nutrients. Blanching is essential in processing most vegetables. This has been proved by many workers, notably Cruess (13). Steam blanching is generally preferred in preparation for dehydration, and is probably less destructive of nutrients than water blanching. Here again time is undoubtedly an important factor, probably more important than temperature, since generally speaking, as steam blanching temperature is increased, exposure to both oxygen and moisture is decreased.

Drying has been shown by a number of the authors already cited to cause large losses of vitamins, especially of ascorbic acid. Perhaps this is the time and place to point out that if an engineer were to set out to design an apparatus for destroying the ascorbic acid in vegetables he would need to make but few and very minor changes in certain of the commercial dehydraters now in use. These driers often provide a combination of high temperature and intimate contact with oxygen which comes near to perfection as far as destruction of this factor is concerned. Although we can scarcely expect a sudden and widespread reform in this procedure, improvement can be made by engineers enlightened by a knowledge of what is necessary and desirable from a nutritional viewpoint.

Effects of packaging and other conditions of storage have been rather thoroughly reported by Chace (1) and Beardsley (6). Here again temperature and access to oxygen appear to be major factors, although moisture content and the activity of enzyme systems are also of great importance.

The literature is much less complete with regard to the reconstitution of dehydrated vegetables, but if we envision the scene in an army kitchen, an emergency field kitchen, or for that matter in the so-called "average home kitchen," and then apply scientific facts and theories to the vision we have conjured, we can readily understand that these same factors of time, temperature, access to oxygen, and contact with water are again involved.

Lastly, we must mention again the matter of enzymatic activity. The possibility of deterioration due to this factor is present in all stages from harvesting the vegetable to its reconstituted form, unless it is halted somewhere along the line. Unfortunately, we lack not only a comprehensive knowledge of just what systems are involved and what to do about them, but also the tools of research with which to discover them. Meanwhile, we go along hoping that the measures we take for destroying the enzymes are adequate for that task, but at the same time will not reduce the nutritional value of the food.

CONDITIONS CHOSEN FOR STUDY

Of the above-mentioned conditions and factors which may affect the nutritive values of dehydrated vegetables we have chosen to study blanching, drying, packaging and storage, and reconstitution. The factors of variety, source, and initial condition we must leave to the horticulturist and plant industry student. Study of factors found in the pretreatment operations is deferred for the moment. The study of enzymes is progressing, but is not yet ready to be reported.

VEGETABLES CHOSEN FOR STUDY

As to the vegetable subjects, we have referred to the list of 7 fresh vegetables which are being dehydrated for government purchase, namely: white potatoes, sweet potatoes, carrots, beets, cabbage, rutabagas, and onions. From this list we have deleted beets, because we soon found that the beets available for our use in this work were too low in nutritive value to be of interest. In certain phases of our studies we have given some attention to fresh green peas, sweet yellow corn, sweet white corn, tomatoes, and green snap beans.

EFFECTS OF BLANCHING

Essentially the process of blanching should accomplish two necessary and desirable results before drying, namely: destruction of the enzymes, and at least partial cooking. As has been pointed out before, destruction of the enzymes is necessary for maximum retention of quality and value. Accomplishment of partial cooking prior to drying helps to speed the drying, minimizes the phenomenon of "case hardening" and facilitates reconstitution. Of the vegetables mentioned herein, only two, onions and tomatoes, are commercially processed without blanching.

The criterion of blanching in our studies was the destruction, or apparent destruction of the peroxidase enzyme system. Pilot tests were made with each vegetable used, to determine the severity of blanch required to obtain negative peroxidase tests using the guaiacol technique. Table 1 details the effect of the blanches used

with regard to vitamin retention in the final test lots which were carried into the drying tests. All these vegetables, except peas, were blanched in steam at 212°F. In order to retain organoleptic quality in the peas it was necessary to use a temperature below 212°F. and this could be accomplished only in a water bath.

The methods used for vitamin estimations in these studies are the same as those previously described by Beardsley (6).

There is no apparent correlation between severity of blanch and vitamin loss shown by these data. Possibly this indicates a wide difference between species in susceptibility to loss at this stage. This point, to our knowledge, has not yet been studied.

Unfortunately, we have learned since making these tests that not only is the guaiacol test somewhat unreliable as an indicator of peroxidase activity, but also that the phenomenon of "regeneration" or "reactivation" of this enzyme casts some doubts on the adequacy of some of the blanches used, which were, however, equal to or more severe than most of those now used commercially. Some of the difficulties inherent in an investigation of the

TABLE 1

Effect of peroxidase inactivating blanch on the retention of ascorbic acid and thiamin in various vegetables

VEGETABLE	PREPARED FORM	STEAM BLANCH AT 212°F.	ASCORBIC ACID RETAINED	THIAMIN RETAINED
		time (min.)	%	%
Peas	Whole	13 (200°F. in water)	41.0	56.0
Yellow sweet corn	Whole kernel	20	54.5	72.4
White sweet corn	Whole kernel	20	74.3	56.9
Green snap beans	Cuts	15	54.3	—
Cabbage	Shreds	3	66.3	—
Carrots	Diced	30	89.9	—
Rutabagas	Diced	4	90.1	—
Sweet potatoes	Diced	7½	78.9	71.4
White potatoes	Diced	3	43.1	100.0

requirements for destruction of peroxidase may be inferred from the following data we have produced:

The guaiacol, alpha-naphthol, benzidine, and gum guaiacum techniques do not agree any too well in results shown. For instance, in diced carrots the guaiacol test indicated complete destruction of peroxidase after 6 minutes at 212°F. The benzidine test indicates a slight residual activity after 12 minutes at 212°F. White potatoes blanched for 3 minutes were negative by the guaiacol test. Blanching for 7 minutes is required according to the alpha-naphthol test, and more than 9 minutes if the benzidine test is used. According to all of the tests used, destruction of peroxidase cannot be accomplished in rutabagas in less than 12 minutes.

We badly need a truly specific and quantitative test for the enzymes which contribute to loss of nutrients in these foods. In the meantime, though, we believe that much can be accomplished by empirical means. The use of very short, high-temperature, steam-pressure blanches should be investigated. Theoretically, at least, such a technique should have definite advantages.

EFFECT OF DRYING

All samples were dried in a cabinet-type, hot-air dehydrater. The experimental unit employed has a maximum load of from 100 to 120 lb. of prepared vegetables and can be closely controlled to simulate the conditions found in any type of commercial hot-air drier.

The prepared and blanched vegetables used in these tests were spread on trays in accordance with suggestions found in government specifications (where available) or in other literature sources (14). Finishing temperatures for the drying process were obtained from the same sources. These temperatures, together with the vitamins retained in terms of percentage of content of the blanched material, are presented in Table 2.

Variation in final moisture content was not studied here, partly because its inclusion would have complicated our over-all reconnaissance of the subject and partly because other students of the subject, cited above, (1–3, 6, 13, 14) have shown adequately for our purposes that it is desirable to reduce the final moisture content of the dehydrated vegetables to the lowest possible figure.

Sacrifice of ascorbic acid during drying appears to be very serious except for peas and onions. Thiamin is better retained throughout the preparation,drying,storage, and reconstitution operations than is either ascorbic acid or carotene. The extensive destruction of these two vitamins is very serious and deserves the attention and cooperation of all concerned to make whatever changes may be needed to reduce this to a minimum.

TABLE 2

Retention of ascorbic acid, thiamin, and carotene in various vegetables during drying shown as percentage of content of the blanched vegetables

VEGETABLE	FINISHING TEMPERATURE	ASCORBIC ACID RETAINED	THIAMIN RETAINED	CAROTENE RETAINED
		%	%	%
Peas	150°F.	100.0	85.8	—
Yellow corn	160°F.	61.0	100.0	70.6
White corn	156°F.	34.5	80.0	50.0
Green beans	150°F.	59.6	—	75.9
Cabbage	148°F.	73.9	—	—
Tomatoes	150°F.	80.4	83.4	—
Carrots	150°F.	58.6	100.0	43.5
Rutabagas	150°F.	68.5	84.2	—
Onions	140°F.	97.3	—	—
Sweet potatoes	157°F.	37.7	100.0	35.9
White potatoes	155°F.	54.3	82.0	—

EFFECT OF PACKAGING AND STORAGE

Among other packaging variables, the dried product was packaged in hermetically-sealed metal cans in an atmosphere of carbon dioxide and (with the exception of onions) in fiber-bodied cans with metal ends. These containers represent, respectively, almost complete protection from oxygen since the oxygen content of the atmosphere within the metal cans never exceeded 2 per cent, and relatively free access to oxygen in that the fiber bodies, though relatively moisture-vaporproof, are permeable to oxygen. Onions were not packed in the fiber-bodied cans because in order to retain their pungency they require an absolutely impervious container. In place of the fiber container, onions were packed in metal containers in an atmosphere of air.

Samples were stored at 70°F. and at 98°F. for a period of 6 months. Table 3 shows the change in content of vitamins during this period in terms of percentage of vitamin content of the dried material at the beginning of the storage period.

Table 3 may be briefly summarized under the following points:

1. Ascorbic acid retention during storage is low except in a few isolated instances.

2. Ascorbic acid retention is generally lower at the higher temperature and when access of free oxygen to the product is permitted.

3. In general, thiamin is well retained during storage.
4. The preponderance of evidence seems to indicate that increase in temperature of storage and free access of oxygen are unfavorable to the retention of carotene.

The two obvious lines of progress inferred from these data are: reduction of oxygen in the hermetically-sealed container to a minimum, and low-temperature storage.

With proper equipment and technique it is possible under commercial conditions to maintain the oxygen content of the sealed container at below one-half of one per cent. Storage temperatures are more difficult to control, especially during wartime, but perhaps the storage temperature will be found to be of less importance if the oxygen available to the product is severely reduced.

TABLE 3

Retention of ascorbic acid, thiamin, and carotene in various dehydrated vegetables during storage for 6 months at 70°F. and 98°F. in metal containers with CO_2 and in fiber-bodied containers with air

VEGETABLE	STORAGE TEMPERATURE	CONTAINER	ATMOSPHERE IN THE CONTAINER	ASCORBIC ACID RETAINED	THIAMIN RETAINED	CAROTENE RETAINED
				%	%	%
Peas	70°F.	Metal	CO_2	70.6	100.0	—
		Fiber	Air	2.9	100.0	—
	98°F.	Metal	CO_2	52.9	41.6	—
		Fiber	Air	0.0	—	—
Yellow corn	70°F.	Metal	CO_2	72.0	62.5	58.4
		Fiber	Air	28.0	56.3	91.7
	98°F.	Metal	CO_2	64.0	33.4	75.0
		Fiber	Air	0.0	—	—
White corn	70°F.	Metal	CO_2	75.0	100.0	—
		Fiber	Air	20.0	100.0	—
	98°F.	Metal	CO_2	100.0	100.0	—
		Fiber	Air	0.0	100.0	—
Green beans	70°F.	Metal	CO_2	86.8	—	90.4
		Fiber	Air	39.7	—	51.2
	98°F.	Metal	CO_2	55.9	—	87.6
		Fiber	Air	50.0	—	73.0
Cabbage	70°F.	Metal	CO_2	100.0	—	—
		Fiber	Air	54.6	—	—
	98°F.	Metal	CO_2	23.8	—	—
		Fiber	Air	14.4	—	—
Tomatoes	70°F.	Metal	CO_2	64.2	—	—
		Fiber	Air	64.2	—	—
	98°F.	Metal	CO_2	76.9	—	—
		Fiber	Air	57.7	—	—
Carrots	70°F.	Metal	CO_2	58.6	—	100.0
		Fiber	Air	29.3	—	62.0
	98°F.	Metal	CO_2	58.6	—	100.0
		Fiber	Air	34.2	—	50.7
Rutabagas	70°F.	Metal	CO_2	66.6	—	—
		Fiber	Air	45.0	—	—
	98°F.	Metal	CO_2	15.6	—	—
		Fiber	Air	13.9	—	—
Onions	70°F.	Metal	CO_2	57.1	—	—
		Metal	Air	48.6	—	—
	98°F.	Metal	CO_2	54.3	—	—
		Metal	Air	45.7	—	—
Sweet potatoes	70°F.	Metal	CO_2	86.4	100.0	57.5
		Fiber	Air	77.2	100.0	61.7
	98°F.	Metal	CO_2	68.1	65.0	1.7
		Fiber	Air	63.6	100.0	51.1
White potatoes	70°F.	Metal	CO_2	100.0	100.0	—
		Fiber	Air	76.1	100.0	—
	98°F.	Metal	CO_2	100.0	100.0	—
		Fiber	Air	81.0	100.0	—

EFFECTS OF RECONSTITUTION

Obviously the goal of those who grow, harvest, store, prepare, blanch, dry, and package these vegetables is to have them finally reconstituted and served as food. Exact directions or recipes for reconstitution are available only for those vegetables which are being purchased by the Quartermaster Corps for the use of the U. S. Army. In our studies of reconstitution we limited ourselves, therefore, to the vegetables in the above lists for which these definite directions are available. The vegetables thus prepared were then separated by means of a 2-minute drain on appropriate screens, into their liquid and solid portions. Table 4(a) and (b) gives the percentage retention of ascorbic acid and thiamin during reconstitution and just prior to reconstitution, and the distribution of the portions of these vitamins which were retained between the liquid and solid parts of the finished product. Table 4(a) gives these data for samples reconstituted immediately after dehydration; Table 4(b), similar data for samples reconstituted after 6 months' storage at 70°F. In order to conform to government specifications, samples of carrots and cabbage were drawn from hermetically-sealed metal cans in which air had been replaced by carbon dioxide. The other 4 vegetable samples were drawn from the fiber-bodied cans which were so made as to have approximately the same protective value as the laminated bag containers specified for those vegetables.

TABLE 4

Retention of ascorbic acid and thiamin during reconstitution and distribution of the retained vitamins between liquids and solids

VEGETABLE	VITAMIN RETENTION DURING RECONSTITUTION		RECONSTITUTED PRODUCT				
			Ratio, Wt. Liquid/Wt. Solids	Ascorbic acid		Thiamin	
	Ascorbic acid	Thiamin		In liquid	In solids	In liquid	In solids
(a) Samples reconstituted immediately after dehydration							
	%	%		%	%	%	%
Cabbage	17	—	1/2.88	72	28	—	—
Carrots	33	—	1/12.85	7	93	—	—
Rutabagas	6	—	1/4.91	38	62	—	—
Onions	34	—	1/1.725	37	63	—	—
Sweet potatoes	18	98	1/3.07	25	75	23	77
White potatoes	21	91	No liquid	0	100	0	100
(b) Samples reconstituted after storage for 6 months at 70°F.							
Cabbage	25.2	—	1/1.73	73.4	26.6	—	—
Carrots	36.9	—	1/133	72.7	27.3	—	—
Rutabagas	36.4	—	1/2.29	81.3	18.7	—	—
Onions	66.4	—	1/1.33	76.9	23.1	—	—
Sweet potatoes	49.8	—	1/2.15	39.7	60.3	—	—
White potatoes	34.8	—	1/3.28	61.7	38.3	—	—

Obviously the losses of ascorbic acid are very great during cooking by the prescribed methods. It is to be hoped that superior methods can be found. As expected, the amount of ascorbic acid retained in the solid portion of the product appears to be a function of the liquid to solid ratio. This emphasizes two points: the minimum amount of liquid required should be used, and all liquid remaining should be utilized in the serving of the food.

Thiamin retention is apparently good; however, in many instances the amounts present were too small to be detected by our method of analysis.

Carotene was not reported in these tables because it appeared to be fully retained during reconstitution. No carotene is lost in the liquid portion of the reconstituted food.

In obtaining all of the above data ascorbic acid was determined by titration with 2,6-dichlorophenol-indophenol, the endpoint being observed visually. Thiamin determinations were made by the thiochrome technique in all cases (15). Beta-carotene determinations were made by the spectrophotometric method of Beadle

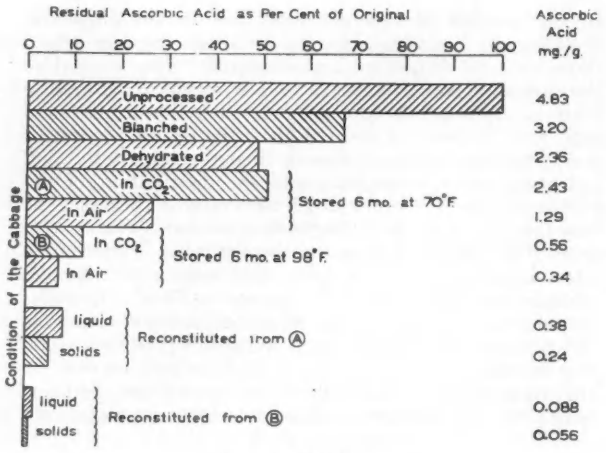

CHART 1. *Cabbage*

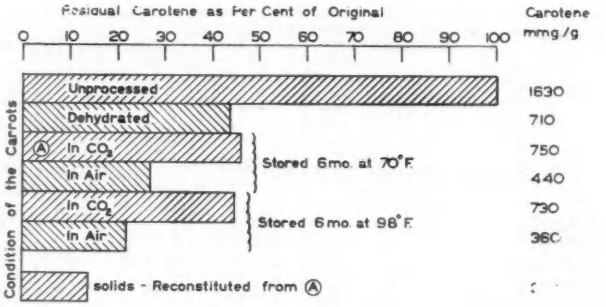
Residual Carotene as Per Cent of Original
0 10 20 30 40 50 60 70 80 90 100
Carotene mmg./g.
Condition of the Carrots
Unprocessed 1630
Dehydrated 710
(A) In CO2 750
In Air 440
Stored 6mo. at 70°F.
In CO2 730
In Air 360
Stored 6 mo. at 98°F.
solids - Reconstituted from (A)

CHART 2. *Carrots*

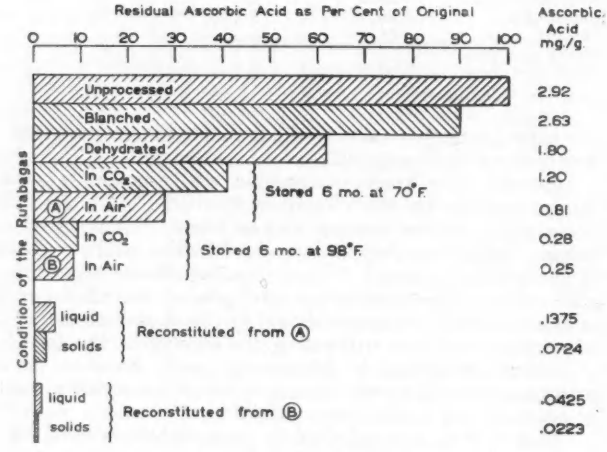

CHART 3. *Rutabagas*

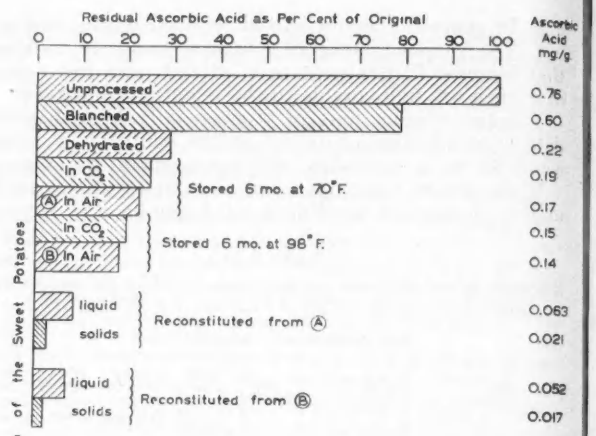

CHART 4. *Sweet potatoes*

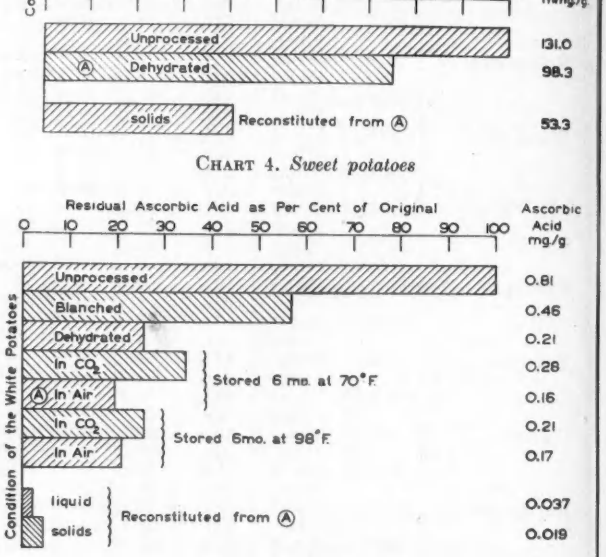

CHART 5. *White potatoes*

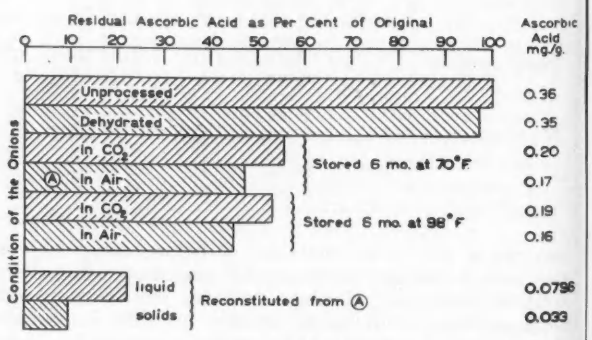
Residual Ascorbic Acid as Per Cent of Original
0 10 20 30 40 50 60 70 80 90 100
Ascorbic Acid mg./g.
Condition of the Onions
Unprocessed 0.36
Dehydrated 0.35
In CO2 0.20
(A) In Air 0.17
Stored 6 mo. at 70°F.
In CO2 0.19
In Air 0.16
Stored 6 mo. at 98°F.
liquid 0.0796
solids 0.033
Reconstituted from (A)

CHART 6. *Onions*

and Zscheile (16). Because of the presence of the pigment lycopene in tomatoes, the carotene method was modified by the technique of Strain (17) for this product.

SUMMARY

Charts 1 through 6 show the losses in ascorbic acid and/or carotene of the 6 vegetables from the raw, unprocessed state to the final reconstituted product, based on data obtained in this laboratory.

In this paper an effort has been made to set forth the major factors and conditions which have been shown by our own studies or by others to affect the nutritive values of dehydrated vegetables. These factors and conditions are considered to be: 1. Variety (within the species). 2. Source and other conditions of production. 3. Condition of the vegetable when processing is begun. 4. Operations involved in pretreatment or preparation. 5. Blanching. 6. Drying. 7. Conditions of storage. 8. Conditions and methods of reconstitution. 9. The activity of enzymes at any stage of the production, storage, or use of the products.

Some of the details of blanching, drying, storage, and reconstitution have been studied in more detail in an effort to obtain leads for development of improved conditions and methods.

Large percentages of ascorbic acid and carotene have been found to disappear in all of the operations studied. Thiamin is more stable and more easily retained. It is probable that other oxidizable and soluble nutrients share the fate of the vitamins studied. It is hoped that some of the inferences and conclusions drawn as a result of this study will receive further attention in order that ways may be devised to conserve the nutrients more efficiently.

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RECENT DEVELOPMENTS IN FATS AND OILS

For the first time in several years Americans are seriously concerned with the fundamentals of foods. The subject of fats and oils, in fact, has never before been fully appreciated. We consume nearly 25 per cent of our total caloric intake as fats in one form or another. Much of our fat consumption, of course, is invisible since it is consumed in the form of fabricated food products such as baked foods, soups, desserts, etc. Fats also play an irreplaceable role in industry; in fact, we Americans are in contact with fats and oils nearly every hour of the day. Fats are important in many industries: for example, leather, plastics, soap, tooth paste, special detergents, paint, clothing, tin-plate, steel, newsprint, miscellaneous foods, cosmetics, machine lubrication, explosives, artificial rubber and in hundreds of others.

Americans consume nearly 11 billion pounds of fats per year of which 7½ billion pounds are used for food purposes. The war has affected our raw material supplies in two ways: first, by increasing the demand for fats not only for our own use but also for the sustenance of our allies; and second, through reduction of supplies by nearly one billion pounds annually through the loss of the Dutch East Indies and the Philippines to the Japanese. Intensified production programs among farmers in this country in the growing of soybeans and hogs have more than made up our fat losses caused by the war.

Fats are important matériel of war. The fall of Germany in 1918 was influenced in no small measure by the shortage of fats. Statistics indicate that the German fat consumption in 1918 fell to a low point of 65 gm. per week per person. This quantity is several times too low for minimum subsistence. Authoritative reports indicate that the present German consumption of fats averages 260 gm. per week per person. This quantity is sufficient to meet their needs, providing other foodstuffs can be maintained on comparable levels. It is obvious, therefore, that the Germans entered the present war under far better nutritional circumstances than was the case during World War I. Nutritionally, Germany has been giving a good account of herself.

What are our American problems concerned with fats and oils? We seem to have an adequate supply at the present time. Shortages exist in certain specific types of fats but these shortages are being compensated for by the interchange of available raw materials. Technological improvements in the processing of fats have come with extreme rapidity during the past few years. Hydrogenation, the use of antioxidants, combined with the development of more fundamental information concerning the structure of fats, have made America practically self-sufficient in the production of edible shortenings. Most important of our technological advances has been the contribution made by nutritionists in the extension of our knowledge of the effect of certain fatty acids on human health. Meat fats, particularly lard, have been found to contain fatty acids that are essential to proper development of children. Skin eczemas have been cured through the increased intake of lard even among infants. Because of these discoveries the use of meat fats in the manufacture of shortening is increasing by leaps and bounds.—*Abstract of an address by George T. Carlin, Swift & Company, presented before the American Dietetic Association, Pittsburgh, October 21, 1943.*

THE NEW THEORY OF IRON METABOLISM[1]

FRANCES A. JOHNSTON, PH.D.
Departments of Home Economics and Pediatrics, University of Chicago

A NEW theory of iron metabolism has been taking form in recent years. Its inception dates from the publication of a paper in Germany (1) in 1931 which attracted scant attention. Not until 1937 when McCance and Widdowson (2) reviewed the evidence then extant, did the theory gain much headway. In that same year several groups of workers in this country became interested in the subject and a number of research projects were initiated in both countries.

The Old Theory in Brief. The old theory of iron metabolism, by no means entirely abandoned, is that almost all the iron present in the food is absorbed in the small intestine. This is a logical conclusion, because almost all of the protein, fat and carbohydrate is assimilated there. This newly absorbed iron then enters the blood plasma where it is pooled with the iron continually being set free by the disintegration of worn-out body cells. As the iron-laden blood circulates through the capillaries in the wall of the large intestine, much of this load of plasma iron, an amount often almost as large as that in the original food, passes back into the intestinal tract and is eliminated in the feces.

The New Theory in Brief. The new theory is just the opposite of the old. Absorption, instead of being almost complete, is held to be small; and excretion[2] from the blood plasma into the alimentary tract, instead of being considerable, is held to be almost negligible. The iron in the feces, instead of being excreted iron, is held to be almost all iron which was never absorbed from the food. The new theory agrees with the old in that the location of absorption is in the small intestine, but there is disagreement as to the site of excretion.

IRON ABSORPTION ACCORDING TO THE NEW THEORY

The Location of Absorption. Recent research seems to verify the theory that the absorption of iron occurs in the small intestine but narrows the zone to the duodenum and upper jejunum. Moore *et al.* (3) blocked off sections of the intestinal tract of a subject by means of inflated balloons and introduced iron salts into the segments thus formed. They found that the amount of iron entering the plasma was the greatest in the duodenum, and next in the upper jejunum. The amount absorbed in lower locations was very small. The explanation for this is that most iron compounds are soluble only in an acid medium and as the contents of the alimentary tract become less and less acid, less and less iron exists in a soluble form.

The Per Cent of Absorption. Because the area over which iron absorption can occur is so restricted and because iron forms insoluble compounds some of which do not even dissolve in the restricted, more-acid area, much iron escapes assimilation. Iron may be contrasted in this regard to sodium which forms compounds soluble even in neutral or alkaline mediums and is consequently absorbed almost entirely. Largely for the above two reasons and probably for other reasons as well, the normal absorption of iron is very limited.

Proof that absorption is small is furnished by the use of radioactive iron. Radio-iron is an excellent tool for such studies as it can be distinguished from other iron and thus acts as though labeled. When fed to dogs, rats, and cows, the proportion found later in the blood and other tissues indicates that very little has been absorbed. Recently, two groups of workers, Balfour *et al.* (4) and Chapin and Ross (5) administered it to human subjects. Both groups found that only 1 or 2 per cent appeared later in the blood and, although they could not make analyses of the tissues which might have taken up some of the iron, they believed that the total absorption was very little more than that found in the blood.

Proof of a low iron absorption is also obtained from analyses of both the food consumed and feces excreted. It is assumed that whatever iron has disappeared from the food mixture during its trip through the intestine has been absorbed. For example, if the food contains 10 mg. and the feces 9 mg., then 1 mg. or 10 per cent has been absorbed. If this method of finding the amount of absorption is accepted, it must be assumed that the amount of iron excreted from the blood plasma back into the intestinal tract is so small as to be negligible. Such an assumption will be made at this point but will be discussed later in more detail. In such experiments, where both the food and the feces have been analyzed, the amount of iron which is found to have disappeared is seldom over 25 per cent, provided the subject is not anemic and has not been depleted of his iron stores. More often the absorption is in the neighborhood of 10 per cent.

To give an exact figure for iron absorption will probably never be possible because it undoubtedly varies from one individual to another and also with the diet consumed. At this point it is pertinent to consider some of the conditions which alter the amount of absorption.

Factors Affecting the Amount of Absorption. There is some evidence that iron must be in the reduced or ferrous form before it can be absorbed. If this is the case, the question arises as to whether ferric iron in food is reduced in the intestinal tract, so that it is in an absorbable condition by the time it reaches that section of the intestine where iron is normally taken up. It is possible that compounds are always present in the gastro-intestinal tract which bring about some reduction and also that other foods eaten simultaneously with the iron-containing ones have some reducing properties.

About ten years ago, an experiment by Elvehjem (6) led to the belief that iron bound up in complex organic molecules such as hematin is not set free in the digestive tract and therefore not absorbed. Such iron was designated as "unavailable." This theory roused considerable interest and soon a number of research projects were undertaken to test it, some of which confirmed the original experiment while others (7–10) did not. The bulk of the evidence seems to indicate that hematin iron is no more "unavailable" than is much iron existing in inorganic forms. The problem, it appears, remains to be solved.

Recently, McCance and Widdowson (11) have reported that phytic acid forms insoluble iron phytates which cannot be absorbed. According to them, phytic acid is found in whole cereals and therefore little if any of the iron found in them is absorbed. They state that the intestine of the rat contains phytase while the intestine of the human being does not and that consequently when phytates are present rats absorb more iron then do human subjects.

There is also some evidence that the store of iron present in the body affects the amount which can be absorbed. When the stores are low, more is taken up. Balfour *et al.* (4) have shown that the absorption of radio-iron increases during the last months of pregnancy when the iron stores have become depleted, and also after a drain on the stores due to hemorrhage. They offer no explanation for this

[1] Received for publication June 1, 1943.

[2] "Excretion" will be considered throughout this paper to mean the passage of iron from the plasma into the gastro-intestinal tract. The term "elimination" will be used to designate the removal of iron from the body in the feces.

at present (May 1943). The size of the iron stores may be the explanation for the greater absorption of iron by women than by men. Widdowson and McCance (12) found that when 4 men and 4 women were placed on the same diet, the absorption (food minus feces) was 12.5 per cent for the women and only 7.3 per cent for the men.

IRON IN THE BLOOD PLASMA

Iron Entering the Blood Plasma. If an absorption of 10 per cent of the iron in the ingested food is assumed as normal, and a diet containing 10 mg. is considered average, the amount of iron absorbed from the food would be in the neighborhood of 1 mg. This small amount enters the blood plasma where it is pooled with other iron. This "other iron" comes largely from the disintegration of worn-out cells, mainly red cells. Since the red cells live only about 100 days, approximately one-hundredth of each cell disintegrates each day releasing around 20 to 25 mg. iron. This amount makes the 1 mg. of newly absorbed food iron which entered the plasma during the same interval of time seem very small, indeed.

Iron Leaving the Blood Plasma. While iron is constantly being added to the plasma, it is at the same time being continually removed in these 5 ways: 1. It is taken up by reticulo-endothelial cells lying along the blood channels which are greedy for iron and remove it quickly whenever the amount in the plasma exceeds the normal fasting level. The liver contains many cells of this type which take up much iron and later pass it on to the liver cells proper. The capacity of the liver to store away iron is very great—greater than just enough for a normal reserve. 2. Plasma iron is removed for the building of new red cells. Since these cells are formed in the bone marrow, the iron is removed as the blood passes through the marrow. Since one-hundredth of each red cell must be rebuilt each day, the amount of iron removed for this purpose is correspondingly large. 3. A very small amount of plasma iron, a fraction of a milligram, is removed by the kidney and excreted in the urine. 4. Some plasma iron may find its way back into the intestinal tract and be excreted in the feces (the fact that this amount is small will be discussed later). 5. Plasma iron is, of course, lost in case of bleeding and there is a simultaneous and much greater loss in the red cells. The shedding of 100 ml. blood entails a total loss of about 48 mg. iron. A summary of the iron entering and leaving the plasma appears in Figure 1.

EXCRETION ACCORDING TO THE NEW THEORY

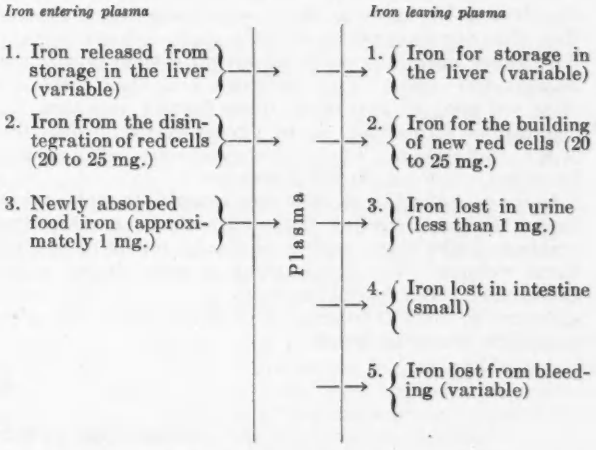
The Amount of Iron Excreted. Of all the iron that leaves the blood plasma, only that removed by the kidney and that excreted into the intestine are permanently lost to the body, aside from such variable amounts of iron as are lost when bleeding occurs. These normal day-by-day losses are very small. Since the urine can readily be analyzed, there is unanimity of opinion that the amount excreted in the urine represents only a fraction of a milligram. There is some controversy, however, as to whether or not much iron is excreted from the blood plasma into the intestinal tract. Whether this excretion is large or small is difficult to prove because the feces contain not only this form of excreted iron but also that unabsorbed from the food. Recently, methods of approaching this problem have been developed.

McCance and Widdowson (13), by injecting iron salts into the veins of subjects, have demonstrated that excretion is small. This procedure greatly increased the amount of iron in the blood plasma, and under such conditions, if iron is ever excreted from the plasma into the intestine, it should be excreted in larger-than-normal amounts. However, no significant increase in fecal iron was evident following the injections. Radio-iron, too, has been used in like experiments by Hahn *et al.* (14) who injected it into the veins of dogs and found the amount which appeared in the feces almost negligible.

Another approach to the subject is to determine the amount of iron required in the food to replace that lost through excretion. Leverton (15) placed 4 women on a diet which contained only 3 to 4 mg. iron. Since only a fraction of the iron in food is assimilated, it is likely that less than 1 mg. was absorbed from this diet. Yet the women were in iron balance (menses not included): that is, the amount absorbed was sufficient to replace the losses. Probably, therefore, the excretion of iron into the intestinal tract amounted to less than 1 mg.

That little iron is excreted is shown by the effect of the iron intake on the hemoglobin level. If the amount of iron absorbed is less than the amount lost, in time the stores become depleted and the hemoglobin level falls. A low absorption follows the intake of an exclusive milk diet, because milk is a poor source of iron. The amount absorbed on such a diet, however, is apparently enough to replace the losses by excretion since adult animals absorb enough to maintain a good hemoglobin level. This is, of course, not true in the case of growing animals nor where there is any blood loss.

FIGURE 1.


Iron entering plasma
Iron leaving plasma
1. Iron released from storage in the liver (variable)
2. Iron from the disintegration of red cells (20 to 25 mg.)
3. Newly absorbed food iron (approximately 1 mg.)
Plasma
1. Iron for storage in the liver (variable)
2. Iron for the building of new red cells (20 to 25 mg.)
3. Iron lost in urine (less than 1 mg.)
4. Iron lost in intestine (small)
5. Iron lost from bleeding (variable)

One explanation for this small excretion is that the reticulo-endothelial cells are so greedy for iron that they quickly remove it from the plasma before it has a chance to reach the capillaries in the wall of the gastro-intestinal tract and be removed at that point. In other words, iron *can* pass back through the intestinal wall but it appears that it seldom gets a chance to do so.

The Location of Iron Excretion. Recent studies on the location of iron excretion fail to verify the old theory that excretion occurs in the large intestine. Welch, Wakefield and Adams (16) found it necessary to sever the intestine of a patient at the lower end of the small intestine and attach the end to the body wall, at which point the food residue was eliminated. Even though no food passed through the large intestine, excretion continued in it normally. Analysis of the colonic contents revealed that only about 0.2 mg. iron per day was being excreted, an amount so small that it can be considered almost negligible. Maddock and Heath (17), during histological studies of the lining of the intestinal tract, carefully removed all iron

contamination from their fixing solutions and found no evidence of iron excretion at any point. Some investigators believe that the small amount of iron added to the food residue as it passes through the intestinal tract is due entirely to such iron as is in the bile and the cells sloughed off from the intestinal wall.

SIGNIFICANCE IN HUMAN REQUIREMENT

In summary, the new theory of iron metabolism holds that only a small proportion of the iron present in the food is absorbed and the amount excreted is almost negligible. The great bulk of the iron used in metabolism is formed in the body itself by the disintegration of red cells. The body uses its iron over and over again. In other words, iron metabolism is largely an endogenous process and very little new iron enters the picture each day. This theory, if accepted, necessitates a re-examination of our ideas of the iron requirement.

In the case of men, iron losses are so very small that almost any diet will serve to replace these. Proof of this is seen in the fact that nutritional anemia is very rare among men. When it does occur, it is almost always associated with internal bleeding of some sort.

In the case of women, little iron is needed to replace that lost in excretions but allowance must be made for replacing that lost in the menses, which is probably much greater than that due to excretion into the gastro-intestinal tract. Nutritional anemia is common among women during the reproductive years. This indicates that their diets are often deficient in iron or in other factors necessary for hemoglobin formation. It is, however, likely that the N.R.C. standard of 12 mg. is very generous. The need is increased, of course, during pregnancy.

In the case of children, little iron is needed to replace that lost in the excretions but allowance must be made for the building of new tissue and in particular for an increasing blood volume. The requirement of girls during early adolescence needs special emphasis; not only do they need sufficient to meet the demands of rapid growth but also to replace menstrual losses.

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Rose Hips as a Source of Vitamin C

During October and November 1941, 5 tons of rose hips were collected in Hertfordshire. Their vitamin C content was highest in mid-November, reaching 400 mg. per 100 gm.; though less rich in vitamin C than Scotch and Northern England varieties, they are still worth collecting. Hips should be stored in a cool place and extracted as soon as possible, since loss of the vitamin begins immediately when they are gathered. Samples of 6 commercial syrups were examined and showed considerable variations in taste and appearance. One sample contained only one-tenth of the vitamin potency required by the Ministry of Health. Of the remainder, however, only one was more than 10 per cent below the official standard. It is suggested that all batches of rose hip syrup should be labeled with the date of manufacture and recommended to be stored in a cool place.

Samples stored at 37°C. showed a loss of 5 to 10 per cent weekly, and at average room temperature, a loss of about 2 per cent. The rate of vitamin destruction was about 10 times as rapid at the *pH* of the syrup as at *pH* 1. It was not possible, however, to produce a palatable syrup with a *pH* much lower than 3.8 and a *pH* of about 4 is recommended. The effect on vitamin stability of varying amounts of sucrose, maltose and maltose-glucose mixtures was studied. The higher the concentration of sugar, the greater the preservative effect. This effect was not specific to any one sugar. Since the destruction of vitamin C is probably an oxidation process, the effect of eliminating as much oxygen as possible was studied. Nitrogen gas, previously passed through alkaline pyrogallol, was bubbled through a sample of rose hip syrup, quickly corked and stored at 37°C. This treatment reduced, but did not entirely prevent loss of vitamin C.—*Wokes, F., Johnson, E. H., Duncan, F. C.: Vitamin C in Rose Hip Syrup. Quarterly J. Pharm. & Pharmacol. 15: 314, 1942, abstracted in Bulletin of Hygiene, April 1943.*

ABSORPTION AND THERAPEUTIC EFFICACY OF IRON PHYTATE[1]

CARL V. MOORE, M.D., VIRGINIA MINNICH, M.S., AND REUBENIA DUBACH, PH.D.

From the Department of Internal Medicine, Washington University, St. Louis, and the Nutrition Clinic, Hillman Hospital, Birmingham, Alabama

THE specifications suggested for the enrichment of flour and bread by the National Research Council's Food and Nutrition Board call for the addition of 6.15 to 24.6 mg. iron to each pound of flour, and of 4 to 16 mg. iron to each pound loaf of bread. Compliance with this program has presented technical difficulties in that most iron salts cause discoloration and those which are easily ionized accelerate the development of rancidity or interfere with the viability of yeast cultures. In order that these difficulties may be avoided, a search has been made for iron salts which are colorless, relatively insoluble, and poorly ionized. Iron phytate meets these requirements and is now being used to fortify flour. However, the very properties (poor solubility and low ionization constant) which make an iron preparation acceptable to the food processor tend, theoretically, to make it less desirable as a source of food iron. It has been demonstrated in absorption studies on human subjects that the factors which favorably influence absorption of iron are: solubility, ease of ionization, and the ferrous valence state (1).

Two reports have appeared which present data to show that orally administered iron phytate can be utilized for the synthesis of hemoglobin. Andrews, Evans and Huber (2) describe experiments with iron-deficient white rats which demonstrated that these animals used iron phytate as efficiently as saccharated iron oxide for the manufacture of new hemoglobin. Nakamura and Mitchell (3), on the other hand, found a poorer utilization of iron phytate than of iron pyrophosphate, ferrum reductum, and ferric chloride. Since iron phytate is currently used as a supplement in both flour and yeast, and since its therapeutic efficacy in man has never been established, we have studied its absorption and utilization in human subjects.

METHODS

Red blood cell counts were made with equipment standardized by the U. S. Bureau of Standards; hemoglobin determinations, according to the method of Evelyn and Malloy (4). Wintrobe tubes were used for the measurement of red cell volume; the cells were packed by centrifugation for 20 minutes at 3000 r.p.m. Serum iron values were determined by the iron thiocyanate method (5); color intensities were read with an Evelyn photometer.

PREPARATION AND PROPERTIES OF THE IRON PHYTATE USED

The iron phytate used in this study was a commercial preparation used for fortifying food with iron. The source of the phytate was "phytin" in steepwater, a by-product of the brewing industry as a result of soaking corn prior to its degermination. The steepwater was heated and filtered to remove suspended material, and then neutralized with lime to re-precipitate the "phytin" as calcium phytate. The precipitate was collected, washed, and suspended in water. Hydrochloric acid was added until the phytate dissolved. The solution was heated and filtered again to remove precipitated proteins. Ferric phytate was then precipitated from the acidified solution by the addition of ferric chloride at a *p*H of about 5.0. Material thus prepared and used in our experiments contained on the dry basis 11.7 per cent iron; 13.6 per cent phosphorus; and 0.25 per cent nitrogen. Less than 4 per cent of the total phosphorus was in the form of inorganic phosphate and less than 0.7 per cent of the total iron in the form of inorganic iron. At 37°C., 0.04 mg. of the material dissolved in 100 cc. H_2O, and 1.56 mg. went into solution in 100 cc. N/10 HCl. It seems highly probable, therefore, that only a small fraction of the iron could have been present as iron phosphate. When the phytate salt was permitted to react for 24 hours with alpha alphá dipyridyl according to the method of Elvehjem and his co-workers (6), 50 to 60 per cent of the iron reacted with the dipyridyl.

SERUM IRON ABSORPTION CURVES

The appearance of iron in the serum after the oral administration of a test dose of one of its salts has been used to study the factors which influence the absorption of iron from the intestinal tract (1). With this method, one cannot measure the amount of iron absorbed, but by comparing the increases produced by comparable doses of different iron salts, one can determine that one salt is more readily absorbed than another.

Serum iron absorption curves were obtained in several subjects following the ingestion of iron phytate. No significant increase above basal levels occurred after a dose of iron phytate which provided 20 mg. iron per kg. body weight. The same subjects had satisfactory increases after test doses of 3 or 4 mg. iron as ferrous sulfate per kg. body weight. These results are interpreted as indicating that iron phytate is much less readily absorbed from the intestinal tract than is a salt like ferrous sulfate. A comparable result was obtained by McCance, Edgecombe, and Widdowson (7) who found that the absorption of both ferrous and ferric iron salts was decreased when sodium phytate was given with the iron.

THERAPEUTIC EFFICACY OF IRON PHYTATE

Quantitative measurement of the amount of iron absorbed from the intestinal tract of human subjects is difficult. Balance studies have been criticized because determinations of fecal iron have a tendency to be low (8). Accurate data may be obtained if radioactive iron is fed (8), but sufficient amounts of the radioactive isotope were not available to make "tagged" ferric phytate for these experiments. Iron may be given in doses sufficiently large to have therapeutic value for patients with hypochromic (iron deficiency) anemia. If it is absorbed, it will stimulate a reticulocyte rise and an increase in hemoglobin. This method has the disadvantage of requiring the administration of amounts of iron greatly in excess of those which could be ingested in a normal diet. It has the advantage, however, of measuring actual utilization (synthesis of new hemoglobin). Furthermore, an indication of the relative efficacy of two different iron salts may be obtained by the "secondary reticulocyte response" method. For instance, after iron phytate is administered for two weeks, it may be withdrawn and ferrous sulfate given instead. If a secondary reticulocyte response is initiated by the ferrous sulfate, the conclusion may be drawn that: first, the response to iron phytate had not been maximal; and second, the ferrous sulfate had greater therapeutic value than ferric phytate. The therapeutic response technique was used in the following experiments.

Seven patients with hypochromic microcytic anemia were given iron phytate in order that its therapeutic value might be tested. All were women and 5 gave histories of having had an excessive menstrual flow. The source of

[1] Presented before the Missouri Dietetic Association, Kansas City, April 10, 1943. Received for publication August 27, 1943.

blood loss in the other 2 patients was not determined. The therapeutic dose of iron phytate was arbitrarily chosen as 12 gm. (equivalent to approximately 1 gm. metallic iron). That the patients were able to assimilate sufficient iron from this amount of iron phytate to cause their hemoglobin values to return to normal or near-normal levels is obvious from Chart 1 and Table 1. The reticulocyte responses in each instance, however, were to dough in sufficient amounts so that each pound loaf of bread when baked would contain 12 gm. of the salt. The quantity of iron added was 60 to 240 times as much as is required in the program for the fortification of bread. Two patients agreed to eat a pound loaf of the bread daily; because it turned rancid in about 24 hours, however, they were not always able to eat all 20 slices cut from each loaf. In both patients (Chart 3 and Subject B. F. in Table 1)

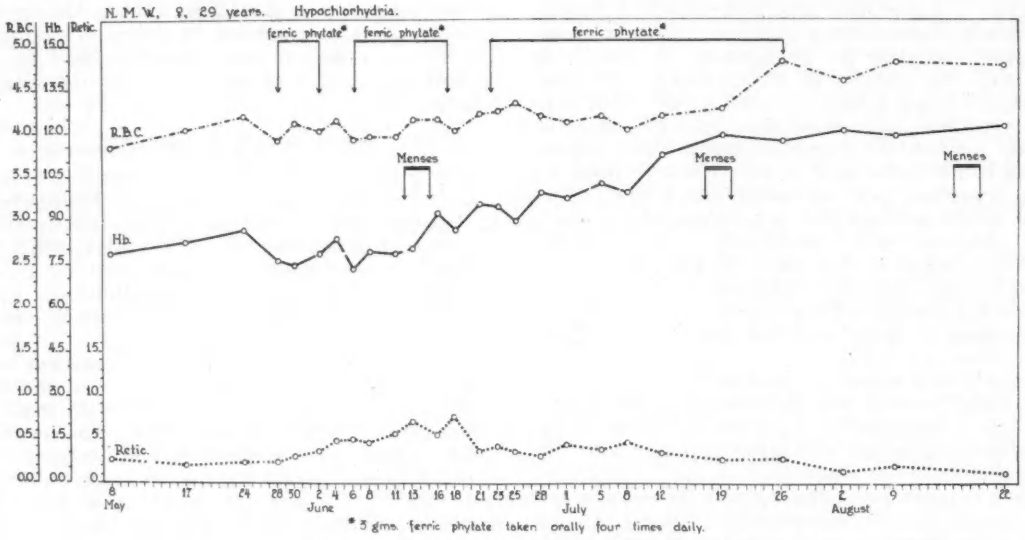

CHART 1. *Therapeutic Response to Iron Phytate*

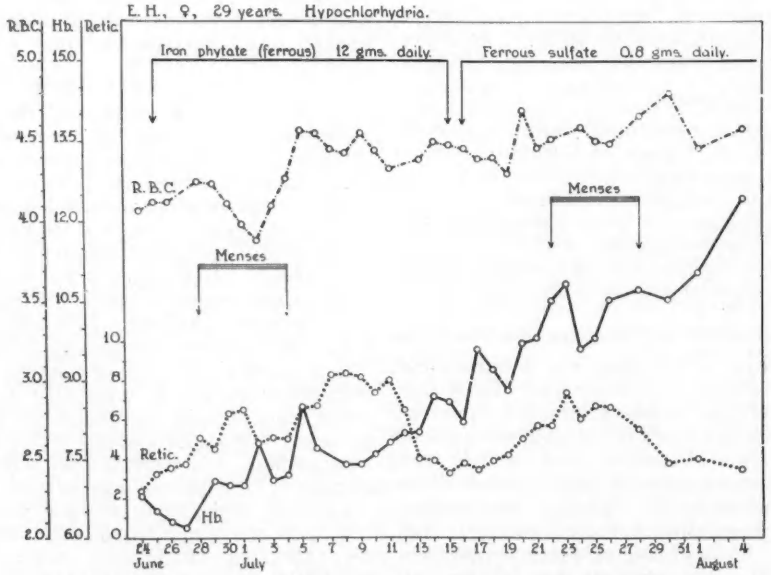

CHART 2. *Therapeutic Response to Ferrous Phytate and Ferrous Sulfate*

rather small. In 3 patients (Chart 2 and Subjects C. D. and D. S. in Table 1), a preliminary period of iron phytate administration was followed by a second period in which 0.8 gm. ferrous sulfate was given daily instead. A small but definite secondary reticulocyte increase followed the ferrous sulfate in each instance.

To eliminate the possibility that iron phytate might be altered significantly when it is baked in bread, it was added there was a significant reticulocyte rise and a satisfactory regeneration of hemoglobin.

DISCUSSION

Since iron phytate was shown to have therapeutic value in the treatment of patients with hypochromic anemia, it is established that absorption of some of the iron occurred. This observation does not necessarily imply, however, that

TABLE 1

PATIENT	SEX	AGE	THERAPY: Iron used	THERAPY: Day of therapy	THERAPY: Date	R.B.C.	Hb.	RET.	CELL VOL.	MEAN CORP. Hb. CONC.	SERUM IRON
						millions	*gm. %*	%	%	%	*mg. %*
G. W.	♀	49	12 gm. ferric phytate	0	5–17–41	3.87	8.0	2.8	28.5	28	.023
				10	6– 7–41	3.97	8.7	4.7			
				21	6–18–41	4.27	10.5	5.8			
				31	6–28–41	4.62	11.0	3.4			
				45	7–12–41	4.74	11.7	1.7	39.0	30	.073
				59	7–26–41	4.58	11.1	1.5			
				(28 days later)	8–23–41	5.33	13.1	0.8	39.5	33	.085
C. D.	♀	21	12 gm. ferric phytate	1	6–24–41	4.57	7.2	1.0			
				3	6–26–41	4.67	7.7	4.5			
				9	7– 2–41	4.84	8.4	9.8			
				22	7–15–41	4.96	9.5	3.6			
			0.8 gm. ferrous sulfate	1	7–16–41	4.86	9.4	2.1			
				11	7–26–41	4.90	10.7	6.8			
				20	8– 4–41	4.83	10.7	3.7			
D. S.	♀	42	12 gm. ferrous phytate	1	7–12–41	4.25	6.5	1.8	27.5	26	.050
				14	7–25–41	4.03	6.3	5.1			
				25	8– 5–41	4.22	7.4	5.3			
			0.8 gm. ferrous sulfate	1	8– 9–41	4.82	8.1	3.1	31.0	26	.049
				11	8–19–41	4.97	10.5	5.7			
				21	8–29–41	5.02	12.3	2.5	42.0	29	.093
B. F.	♀	39	ferric phytate bread, 10–12 gm. daily	1	6– 3–41	4.06	7.2	3.6	27.0	27	
				10	6–12–41	4.25	9.1	7.6			
				21	6–23–41	4.65	11.2	6.8			
				39	7–11–41	5.19	12.3	1.4	40.0	31	.094
				(50 days later)	8–30–41	4.83	12.8	2.0	40.0	32	.080

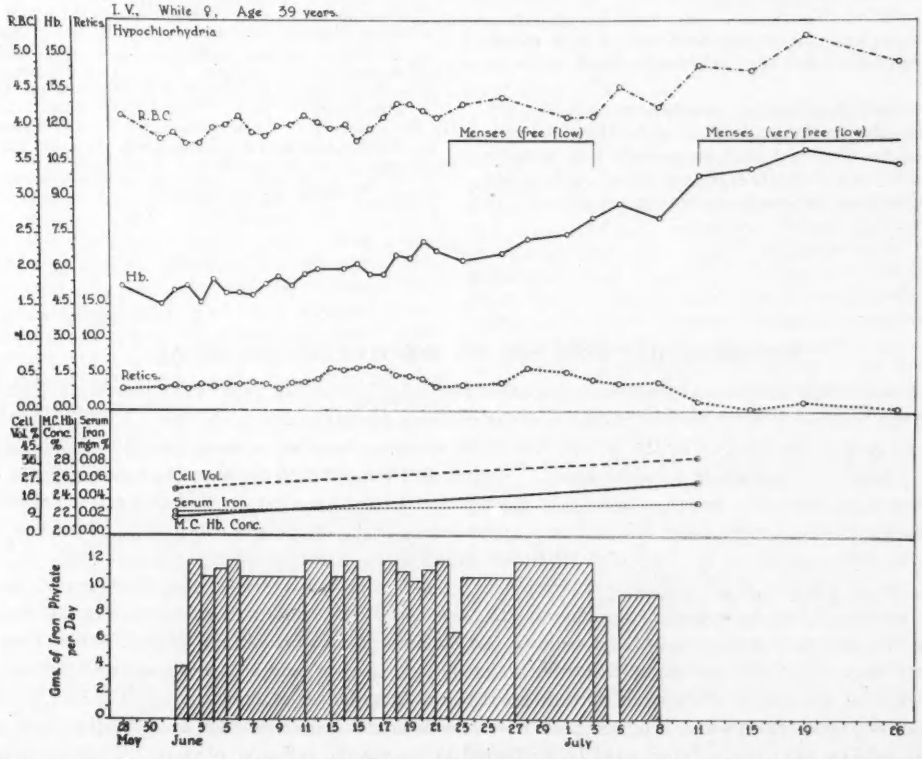

CHART 3. *Therapeutic Efficacy of Iron Phytate Bread (12 gm. iron phytate baked in a 1-pound loaf of bread) in the Treatment of Hypochromic Mycrocytic Anemia*

iron phytate is an efficient source of iron for use in the food fortification program. The following calculations indicate even that the reverse may be true. One gram of iron as iron phytate had less therapeutic efficacy in these studies than did approximately 0.3 gm. iron as ferrous sulfate. The iron phytate, therefore, was less than 30 per cent as well

absorbed as was ferrous sulfate. If one assumes that 16 mg. iron as ferrous sulfate per loaf of bread would be completely absorbed, less than 4.8 mg. of a similar amount of iron as iron phytate could be assimilated. Furthermore, absorption of iron is usually less than 50 per cent complete even when fed in small amounts to patients with hypochromic anemia. This would indicate that less than 2.4 mg. iron would be absorbed from each pound loaf of bread containing the maximum recommended amount of iron phytate. Since a pound loaf is usually cut into 20 slices, each 6 slices of this bread would contain a maximum of 0.72 mg. absorbable iron; and if minimum (4 mg.) instead of maximum (16 mg.) amounts were used in fortification, then the .72 mg. value would have to be reduced to .18 mg.

These calculations are admittedly based on a number of assumptions, but in each case the figures used tend to favor the iron phytate. While it is not possible at present to make an adequate comparison of iron phytate with the other iron salts used for fortification (like iron phosphate, iron pyrophosphate, ferrum reductum), cognizance should be taken of the fact that in rats iron phytate was not utilized as well for hemoglobin production as were ferric chloride, sodium iron pyrophosphate, and ferrum reductum (3). Data on human subjects are not available for these other compounds. The conclusion seems justified that the daily ingestion of 6 to 8 slices of bread fortified with iron phytate would probably lead to the absorption of only a fraction of a milligram of iron.

CONCLUSIONS

1. Iron phytate is a relatively insoluble salt of iron, much less readily absorbed from the intestinal tract than is ferrous sulfate.

2. Patients with hypochromic microcytic anemia respond therapeutically to the oral administration of 12 gm. iron phytate daily. The fact that secondary reticulocyte rises occur when 0.8 gm. ferrous sulfate is given daily after several weeks of iron phytate administration, suggests that the therapeutic response to this dose of iron phytate is not maximal.

3. When large amounts of phytate are baked in bread and the bread is used as a therapeutic source of iron, satisfactory hemoglobin regeneration occurs in patients with hypochromic anemia.

4. The daily ingestion of 6 to 8 slices bread fortified with iron phytate would probably lead to the absorption of only a fraction of a milligram of iron. Because of its relatively poor absorbability, iron phytate is not a thoroughly satisfactory salt to use for the fortification of foods with iron.

ACKNOWLEDGMENT

The authors wish to acknowledge gratefully the help given them by the Anheuser-Busch Company, Inc., in arranging to have the iron phytate used as an ingredient in the bread.

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MINERAL METABOLISM ON DEPHYTINIZED BREAD

. . . .It was shown that calcium and magnesium were absorbed much less readily from brown than from white bread diets. It was considered that the reduced absorption was probably due to the large quantities of phytic acid in brown bread, and this view was enhanced by the fact that the effects of brown bread on mineral metabolism could be reproduced by adding sodium phytate to white bread. Nevertheless the fact still remained that brown bread had a laxative action, and there was as yet no proof that this was not playing some part in hindering calcium absorption. Metabolism experiments were carried out on 3 men and 3 women living on diets in which 40 to 50 per cent of the total calories were supplied in the form of dephytinized brown flour. Control experiments were made with diets containing similar amounts of white flour or of brown flour reconstituted from a mixture of white flour and untreated bran. It was found that hydrolysis of the phytates to phosphates led to improved absorptions of calcium, magnesium and phosphorus in every one of the 6 subjects, but the absorptions were still not so good as they were from white bread diets. If most of the phosphates were also removed, however, and a dephytinized and demineralized loaf was prepared, the calcium absorptions were almost the same from diets containing this bread as they were from white bread diets, even though their laxative effects were very different. It is concluded from this that the poor absorption of calcium from brown bread must be attributed to the specific action of phytates. Phosphates have a similar but smaller inhibitory effect.

Magnesium and phosphorus absorptions were never as good from dephytinized bread as they were from white bread. It is suggested that the magnesium in the dephytinized and demineralized brown bread was combined with the residual phosphate, and the two ions were mutually preventing each other's absorption.—*McCance, R. A. and Widdowson, E. M., J. Physiol. 101: 304, 1942, abstracted in Bulletin of Hygiene, August 1943.*

SURVIVAL FOODS OF THE AMERICAN ABORIGINE

LLOYD G. CARR[1]

Department of Anthropology, University of Pennsylvania

IN THE path of war, food becomes a problem of major consideration. Herbert Hoover reminds us "we will have to feed the world again," and Claude R. Wickard declares the better we manage the food problem the sooner we will win the war.

In studying the food practices of the American Indian some facts have come to light of interest in the scheme of food economy which now confronts us. The situation at present somewhat parallels that described by Parmentier (1) in 1772. The preface to the English translation of his book serves as well to introduce this discussion.

> At the present period of scarcity and dearness of provisions, when the common people have been already excited to discontent and tumult, by the distress that was so soon begun to press upon them, and by the prospect of the still deeper distress in which they will probably be involved before another harvest, . . . it is incumbent upon every man to propose whatever means he may suppose likely to avert or alleviate the impending calamities. . .
>
> The frequent and serious attacks of scarcity, and even of famine, felt in France, render researches like M. Parmentier's an object of the highest national importance; and, unhappily, the present year has afforded ample proof that no fertility of soil, or skill in husbandry, can absolutely secure any nation against such disasters.

Field investigators who have given intensive study to isolated groups note that when the Indians live on the foods from the soil they till and those found in the woodland, hill, and stream, and avoid the highly processed modern foods, they are, on the whole, healthy and vigorous; but when they are introduced to the foods of civilization and thereby neglect their native foods, tooth decay becomes rampant and degenerative diseases follow. Price (2) came to this conclusion in his dental studies of groups in various parts of the world.

Unfortunately, there is a tendency to belittle the food habits and medicinal practices of native groups as elementary and unscientific. However, we should think twice before we renounce the accumulated wisdom of a group such as the American Indian concerning food. The natives and the early settlers in this country were forced to obtain food and medicine from their natural surroundings. Through trial and error they selected those plants which would cure their ailments and those foods which would give them the endurance to withstand the rigors of the elements. They were not aware, scientifically speaking, that the plants they utilized for medicines contained in many instances active therapeutic ingredients, while those utilized for food were rich in minerals and vitamins. It remained for modern science to discern these facts.

The attempt by Eric the Red to settle Greenland in 985 A.D. came to nought because of lack of knowledge of what could be utilized from the natural surroundings; if Eric had known that his Eskimo neighbors were flourishing on raw and dried fish, eggs, and berries derived from their bleak surroundings, his attempt to settle Greenland might have succeeded.

If stranded in an area where native groups have been surviving for ages, it is necessary to observe the food habits of these groups and place one's confidence in their accumulated knowledge of native foods and medicines. The men in the armed forces, too, should realize that in most instances they need not suffer unduly from hunger when isolated from their bases of supply if they have some knowledge of what the local flora and fauna can offer in the way of food and medicine. It remains for the scientist to make available to our soldiers a knowledge of the plants and animals that can be utilized in time of emergency in various regions of the world.[2]

Some foods common to the diet of the American aborigine are presented in the following survey. Only those foods will be mentioned which are little known except to the trained observer of the less advanced ethnic groups.

THE ACORN

During food scarcities the acorn cannot be overlooked as a rich and plentiful source of food. Even today the Pamunkey Indians of Virginia speak of the use of acorns, especially those of the white oak which are preferable for size and sweetness. The Pamunkey Indians say that during the Civil War when Union and Confederate armies were contending in the environs of Richmond, the people of Pamunkey were reduced to subsistence upon what could be gathered in the open territory, crops and food supplies having been confiscated and fields devastated. During this period of stress they had to depend on acorns, one of the aboriginal food resources for the making of flour and bread. The potential value of acorns as a food source is not inconsiderable, for the oak is fairly common all over the world.

When acorns are parched over coals they are decidedly sweet and palatable. After parching, the shells may be removed and the meat powdered between stones, the resultant meal being treated as flour. This procedure requires scarcely any equipment and results in a rich source of food material. Acorns are known to contain starch, a fixed oil, citric acid, uncrystallizable sugar, and a special sugar known as "quercit." It has been noted that acorns, when roasted and ground, can be employed as a fair substitute for coffee. Josselyn (3) made interesting comments on the oil of the acorn and its preparation. "And out of the white Oak acorns (which is the acorn Bears delight to feed upon): the Natives draw an Oyle, taking the rottenest Maple Wood, which being burnt to ashes, they make a strong Lye therewith, wherein they boyl their white Oak acorns until the Oyl swim on the top in great quantity; this they fleet off, and put into bladders to anoint their naked limbs, which corroborates them exceedingly; they eat it likewise with their Meat, it is an excellent clear and sweet Oyl."

Perhaps the earliest record of the use of acorns by the Virginia Indians was made by Hariot (4) in his account of the first English plantation of Virginia, printed in 1588. Speaking of acorns in general he says, "The fifth sort is called Mangummenauk, and is the acorne of their kind of oake, the which being dried after the maner of the first

[1] *Life*, for August 5, 1940, pictured Mr. Carr at work as a botanist, entomologist, and ichthyologist during the summer of 1940 when he served at the Mountain Lake Biological Station of the University of Virginia. Later he was appointed Thayer Scholar, Harvard University. At present, as Harrison Fellow at the University of Pennsylvania and assistant to Dr. Frank G. Speck, he is preparing a series of papers on survival foods, drinks and medicines of the American aborigine and assisting in ethnological field work.

[2] *Editor's Note:* Since this paper was written, an illustrated manual by Dr. E. D. Merrill, entitled "Emergency Food Plants and Poisonous Plants of the Lands of the Pacific" has been published by the U. S. Government Printing Office. In May the BHNHE, of USDA, issued a release entitled "Wild Greens for the Picking," in which country dwellers are urged to utilize lambsquarters, dock and poke. "Food and Health From Wild Greens or Pot Herbs in New York State," which describes thirteen varieties of such weeds, is supplied free by the Nutrition Service, Division of Maternity, Infancy and Child Hygiene, Department of Health, Albany. *See* also p. 694 this JOURNAL for October.

sortes [that is, dried upon hurdles made of reeds with fire underneath], and afterward watered they boile them, . . . doe eate them with their fish or flesh."

Roger Williams (5) in relating the use of acorns by the New England Indians says, "These akornes also they drie, and in the case of want of corne, by much boyling they make a good dish of them; yea, sometimes in plentie of corne do they eate these akornes for a novelty."

The California Indians utilize the acorns of *Quercus lobata* and *Q. agrifolia* which are very useful in the preparation of wholesome flour. It has been pointed out by Merriam (6) that the California acorns made a gelatinous food containing from 18 to 25 per cent of oil.

History tells us that the earliest inhabitants of Greece and Southern Europe who lived in the primeval forests were supported almost wholly on the fruit of the oak. They were also described by classic writers of the period as fat of person and were called *balanophagi*—"acorn eaters."

Smith (7) states that it is possible the human race as a whole has depended upon acorns as a source of nourishment more than on wheat, for wheat is the basic food of only one of the four large masses of humans, the European-North American group. "The other three groups, the Chinese-Japanese, the Indian (Asiatic), and the tropical peoples pay small attention to wheat; hundreds of millions of their people have never heard of it. Meanwhile those humans and possibly their antecedents who dwelt in or near the oak forests in the middle latitudes—Japan, China, the Himalaya mountains, West Asia, Europe, North America—have probably lived in part on acorns for unknown centuries, possibly for thousands of centuries. In Ovid's *Metamorphoses* there is a similar account, for man's first food, he says, was supplied by green herbs until the acorn was found, and thereafter all was well since the hard oak furnished immense wealth.

OTHER SOURCES OF FLOUR

In considering substitutes for flour several tubers come to our attention, which have had long histories among the American Indians. The one that stands out strikingly because of its commonness and availability is the cat briar or green briar (*Smilax*) of our woodlands and thickets. Barton (8) related in 1798, based upon information obtained from William Bartram, that the large tuberous roots of the *Smilax China* (*S. pseudo-China*) offered our southern Indians a nourishing food. "The fresh roots are well macerated in wooden mortars. The mass is then put into vessels nearly filled with clear water, where it is well mixed with paddles. It is decanted off into other vessels, where it is left to settle, and after the subsidence is completed, the waste is cast off, leaving the farinaceous substance at the bottom. When this is taken out and dried, it is an impalpable powder of a reddish color. Mixed with boiling water, it becomes a beautiful jelly which, when sweetened with honey or sugar, affords a most nourishing and pleasant food for children or aged people. The Indians sometimes use it mixed with fine corn-flour, and fried in fresh bear's oil." Needless to say, the cat briar root is rich in starch and various species have been used as food in different parts of the world. The use of this root for food dates from prehistoric times, for evidences of its use have been discovered among Webb and Funkhouser's archaeological finds in the rock shelters of Kentucky, sites which are proximated as 4000 years old (9). Hariot (4) in 1588 tells of its being used by the Virginia Indians, who chopped the roots into small pieces which were then crushed, mixed with water, and then strained to procure a juice used in making bread. Recent studies in the Virginia area disclose that the Indians there appreciate its value to this day.

Another source of starch for flour is the root of the common cat-tail that flourishes in marshes and swamps, also used by the Indians as a source of food. Parker (10), in discussing some foods of the Iroquois, says, "The roots of the cat-tail were often used. Fried and pulverized the roots made a sweet white flour useful for bread or pudding. Bruised and boiled fresh, syrupy gluten was obtained in which corn meal pudding was mixed." It should be remembered that the rich starch content of the plant is especially concentrated in the rhizones (roots) in the dormant condition before growth begins in the spring. In New Zealand and Scind the natives have found the pollen of cat-tail valuable in making bread.

A bulb that stands out as a possible survival food is that of the sego-lily which played such a prominent part in the history of the Mormons. They pushed westward into Utah in 1846 and during the failure of their crops in that year they were far-sighted enough to rely upon the Indian herbs, among them the sego or *Calochortus* which they utilized as a source of flour.

From the persimmon, the Indians made puddings and bread by husking the ripe fruit, mixing it with corn meal and baking. I have eaten the "simmin" bread as prepared by the Virginia Indians and found it tasty as well as nutritious. As a matter of fact, analyses of the wild varieties of the fruit show it to be high in vitamin C, containing approximately 2500 mg. per kilogram green fruit (11). Here is a source of vitamin C that could be utilized for both our armed forces and civilian populations. Persimmons may be packed in jars or dried as the Cherokee Indians used to do. The knowledge of the value of the persimmon fruit is widespread among the Indians. We have found that the Nanticoke Indians of Delaware, the Rappahannock, Chickahominy, and Pamunkey tribes of Virginia, and the Cherokee of North Carolina, as well as the Catawba of South Carolina, have known of its value from early times. Captain John Smith (12) in his narratives comments on its use by the Virginia Indians.

The Indians have knowledge of an herb that the Dutch call *melden*, the seeds of which are used to thicken broth, and the saline ashes of its stalk to season broth and stews. The plant, commonly found both in urban and rural areas in America, bears the botanical name, *Chenopodium ambrosioides*, and could serve to replace the scarcer food seasonings. Archaeological explorations reveal that American Indians have used this plant from prehistoric times.

Smith (12) and Strachey (13) tell us that the Indians planted the maracock or passion flower (*Passiflora incarnata*) in "cart loads." The fruit was considered a delicacy. The Cherokee Indians are still using it today, in fact, a Cherokee boy told us that some of the families make a delicious fermented drink from the fruit of the passion flower, which they call the wild apricot.

Hariot (4), speaking of the Virginia Indians, says that the great sunflower (*Helianthus annus*) affords seeds that were used "both to make a kind of bread and broth." There is no reason why this long cultivated plant cannot furnish a substantial flour today. The bread or broth made from the sunflower contains helianthic acid, believed by the Indians to be an excellent preventive of intermittent fever and ague.

Hominy, too, was originally used by the Indians from whom we have borrowed its name. When hominy is prepared by crushing the corn with rocks or in a mortar, the resulting product is of high nutritive value, containing 8 per cent protein and 78 per cent carbohydrate. Fernie (14) tells us that it has been shown to be as nourishing as

wheat, except for its mineral content, and richer in fat than any cereal other than oats.

GREENS

The American Indians recognize the food value of greens or cresses, and consider dandelions, which are so bountifully available in our fields, as staple food. Indeed, these cannot be overestimated with respect to their content of minerals and vitamins. Furthermore, it may be possible to have greens throughout the year, for the winter rosettes are usually present even in severe weather.

The Catawba Indians of South Carolina and those of Virginia make use of turnip greens all winter. Pokeweed is available in the spring and when properly cooked makes a palatable dish. We sampled some prepared by a Cherokee Indian woman who selected a pint of the greens from her cannery, heated them in lard, and served them with scrambled eggs. The abundance of the wild pokeweed (*Phytolacca americana*) makes it a handy and readily accessible source of food.

Peppergrass (*Lepidium*) is another green commonly found in fields the year round in certain parts of the country; it may be boiled with meat or served with eggs. The same applies to lambsquarters (*Chenopodium album*) which makes its appearance in the spring.

The Indians are wise in their choice of water-cress, for in addition to its vitamin content it is rich in a sulfo-nitrogenous oil, iodine, iron, phosphates, potash, and the medicinal oil, sulfo-cyanide of allyl. According to Fernie, Dr. King Chamber has this to say of water-cress: "I feel sure that the infertility, pallor, fetid breath and bad teeth which characterize some of our town population, are to a great extent due to their inability to get fresh antiscorbutic vegetables as articles of diet; therefore, I regard the water-cress seller as one of the saviours of her country."

With plenty of greens available, and fortunately our fields, roadsides, and hills are lavish with them, no one need suffer from a deficiency of vitamins and minerals, for the greens are a rich source of these.

We are reminded again of Ovid's *Metamorphoses:*

> "Happy the age, to which we moderns give
> The name of golden; when men chose to live
> On Woodland fruits; and for their medicines took
> Herbs from the field, and simples from the brook."

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Dietary Prejudices

Americans are notorious for the number of things they won't eat. We judge foods by our prejudices instead of with our taste buds. When I was a youngster swordfish was no more popular than shark is today and sold for only a couple of cents a pound. Dogfish, shark, goosefish and skate—favorite varieties in Britain—are rejected here.

The early settler who put the "rat" in muskrat condemned a really delicious meat animal. Muskrats have long been avidly consumed in Baltimore under the more euphonious name of "marsh rabbit."

In some regions people won't eat dandelion leaves; they are nutritious and delicious. Ferns are another neglected delicacy, either raw as a salad or boiled. The edible portions are the fiddleheads, or young shoots just as they begin to uncoil. They are canned in Maine and sold in Boston stores.

Once we Americans shed our dietary prejudices, such little-known edibles can add hundreds of millions of pounds of wholesome foods to our national larder.—*From the American Magazine, July 1943, noted in the Reader's Digest for August 1943.*

Vegetable Proteins

That the dry legumes are both absolutely and relatively rich in protein is a fact so well recognized as not to require elaboration. Less generally realized is the fact that while the *fresh vegetables* contain too much water to show high absolute values (or percentages by weight) of protein, yet they show as much or more of their total calories in the form of protein as is customary or desirable in ordinary dietaries.

The vegetables differ among themselves in the nutritive efficiency of their proteins. Probably the proteins of the leaf vegetables are, weight for weight, of somewht higher nutritive efficiency than the proteins of the seeds. But when the whole (or nearly all) of the seed is used for food, the proteins of seeds are probably of higher average nutritive value than is generally realized. Soybeans as well as the more familiar beans and peas are important foods both when young and when mature.

The true pea (*Pisum sativum*), largely grown in the northern states and in Canada, consists of two groups of varieties, the sugar or garden peas whose seeds wrinkle when dry, and the field peas which remain smooth and round when dry. The former are grown only for human food and are used green; the latter are used as split peas and are also grown as a forage crop, particularly in Canada, and are therefore called Canada field peas.

Pea meal was shown by Osborne and Mendel to supplement satisfactorily the deficiencies of corn proteins. Jones and co-workers also find the proteins of peas to be of high nutritive value.—*From An Introduction to Foods and Nutrition. By Henry C. Sherman and Caroline Sherman Lanford. New York: The Macmillan Company, 1943.*

Editorial

THE PITTSBURGH MEETING[1]

With advance hotel reservations totaling over 800, the first day's registration the largest in history, and total registration well over the 1300 mark, the twenty-sixth annual meeting of the American Dietetic Association—aptly predesignated a Wartime Conference—surpassed all expectations with regard to interest and marked timeliness.

The tempo of the meeting, accelerated in line with the war effort, was characterized by close adherence to the time schedule for opening and closing all sessions. The stage was set for this when, ably engineered by Mrs. Jennie Barton Nichols,[2] the Welcoming Luncheon, always a sparkling affair, began on schedule and ended in ample time for the opening session. Even the keynote speaker of the convention, the Hon. Claude R. Wickard, arrived well ahead of schedule, and of all the prominent speakers listed on the program, only one was "unavoidably detained," and only one failed to submit a prepared manuscript for publication. This, and the general excellence and timeliness of the papers presented, attested the careful attention to the mechanics of program planning on the part of the local chairmen and the Association's Executive Secretary, Mrs. Katherine Mitchell Johnson.

One indication of sincere interest on the part of the membership in meeting the needs of the hour was the attendance, despite the problems of staff and labor shortages, rationing, and extra-curricular community work, of 54 of the 70 directors of approved training courses for dietitians, according to Gladys E. Hall, Educational Director. More than 500 visited the Officer Procurement Services booth where the trim, well-tailored, work, summer, and winter uniforms of the Army dietitian, displayed on life-size models, attracted much attention. As a result, a probable enlistment of 70 as Medical Department Dietitians is anticipated, according to Major Moreland, in charge.

The sympathetic concern of dietitians in the food problems not only of this, but of other countries, was evidenced by the intent and serious expressions of those who thronged each meeting, particularly when Else Margrete Roed of the Royal Norwegian Embassy, from first-hand experience, told of the suffering and food shortages of the Norwegians under German oppression, and Andre Michalopoulos, former Minister of Information and member of the Greek Cabinet, dramatically portrayed the epic bravery of his countrymen—a bravery that has been traditional with the Greeks since ancient times—in holding back the Italians and refusing to "cooperate" when their country was occupied by the Germans.

The following subjects, listed in what may be the order of their importance at the moment, were included in the program: dietitians in the armed services; the accelerated training program for dietitians; rationing and availability of foods; wartime labor problems in the institution; dietitians in the industrial feeding program; the feeding of trainees for the Army and Navy; wartime problems of the school lunch; food preservation in the institutional kitchen; institutional equipment in wartime; the training of Dietitian's Aides; developments in food technology; and the ever-present problems of conserving food values and eliminating food waste. Nor was the food and nutrition situation overlooked as it exists in countries allied to ours, in spirit and in action, in safeguarding the principles of democracy.

But amidst the serious discussions of the more pressing problems of a wartime economy, there was no lack of interest in a continuing program with regard to the dietitian's participation in the training of student nurses and the nutrition education of the public. As always, and despite the pressure of the times, an intelligent understanding of and respect for the advancing knowledge of the science of nutrition and its application were sensed in the audience at the sessions where research findings were reported; these centered largely on fats and proteins, of paramount nutritional concern at the moment.

Striking evidence of professional growth, too, was indicated in the report of the Secretary, Mrs. Bessie Brooks West, in which a 10 per cent membership increase over 1942 was noted. As of October 15, the membership now totals more than 6000. At the close of the meeting the incoming Executive Board accepted the recommendation of the House of Delegates that the 1944 meeting be held in Chicago.

THE ASSOCIATION'S BUSINESS MANAGER RESIGNS

I can remember my first visit to the business office of the American Dietetic Association. It was in 1931 and the office was a little place in a building on East Washington Street. The person who was to interview me about a job in her department happened to be the President of the Association and the anticipation of presenting myself to such a personage was something I could not face with equanimity. As I waited in the office my determination was slowly dissolving in doubt and trepidation when the door to the inner sanctum opened and a petite person with beautiful hair and a low husky voice introduced herself as Dorothy Lenfest who managed the office. Quite casually she engaged me in an absorbing conversation about inconsequentials which changed just as casually to the question at hand. By the time the President was ready for our interview, my self-esteem had been built up to the point where I could have asked her confidently for the top position in her department. In the ensuing years I have met many members who have gone to the office to talk to Miss Lenfest and who have come away with the same inspired sense of their professional station and the confidence that there was important work for them to do.

It has always been a source of wonder to me that Miss Lenfest, whose schooling had few elements in common with that of the dietitian, could have developed such an exalted idea of the usefulness and purpose of dietetics. Her father was a physician who practised medicine in the New England tradition. Perhaps it was that fact which led her to the conviction that any profession allied with medicine must have a comparable dignity. Perhaps it was just a native Yankee sense of integrity. Whatever the motive,

[1] Information concerning the national officers elected and appointed, who took office immediately following the Pittsburgh meeting, appears on the Officers Page of this and the November JOURNAL. Other details concerning the official proceedings of the American Dietetic Association, and the list of hospitals offering training courses for dietitians, approved by the Association, will appear as a separate publication, edited and distributed to the membership through the headquarters office of the Association at 620 North Michigan Avenue, Chicago. As in the past, papers presented by various speakers at the meeting will appear in appropriate issues of this JOURNAL.

[2] Mrs. Nichols and Grace Godfrey were general convention co-chairmen, assisted by Sylvia J. Levie, Irene Willson, Mrs. Meredith Moulton Redhead, Hester Griffin, Frances Swenson, Maxine Schumacher, and Mrs. Ruth Snyder Marshall.

Miss Lenfest has always conducted the work of the office not only with the efficiency which one would expect of a manager but also with the realization that the business affairs of the Association were the outward manifestation of the professional dignity of its members.

Growing up with the Association was not an easy matter. Measured in financial terms, there is now four times the volume of business there was twelve years ago when Miss Lenfest took over the office. Several times she has had to move to larger quarters and to add to the staff and equipment. The staff has been carefully chosen and every member who meets these young women either on a visit to the office or at a convention is assured that the business manager shares her responsibility with efficient and interested workers. Only with the teamwork which is possible among intelligent and loyal people could the office force have taken care of the amazing volume of work which has grown as steadily as the membership list. Whether one views it from the standpoint of the office organization, handling the advertising for the JOURNAL, or the excellent management of conventions, Miss Lenfest has established a pattern for the business affairs of the Association which places it in the top rank of professional organizations. Every detail down to office furniture and letterheads has been selected with taste and care and the whole picture represents the tireless devotion and effort which she has given to her work.

I have always suspected that tending the growth of an adolescent organization was the least arduous of Miss Lenfest's duties. A new Executive Board every year would try the patience of an angel. Miss Lenfest's intuitive appreciation of the values dear to each officer, her tact in keeping those values uppermost and her phenomenal memory for precedents which are not on paper, have helped to avert many a minor catastrophe and to make each presidential year of some special benefit to the organization. Only a person with a keen sense of humor and a lively intuition could maintain the status quo in the office and still give every President her way.

After twelve years of devoted service to the Association, Dorothy Lenfest is leaving us for work in another field. We wish her well and we hold dear the memory of a personality who has been a valued friend to many of us and whose work has left a lasting imprint on the pattern of our organization.—FRANCES MACKINNON.

Nutrition and the War

HOSPITALS AND FOOD RATIONING[1]

ELIZABETH HEDGECOCK

In order to obtain a fairly representative opinion of hospital ration problems, the Office of Price Administration this year requested that a questionnaire be formulated by the Administration Section of the American Dietetic Association and Miss E. Costello of the OPA and sent to a small selected list of hospitals.

The replies to this questionnaire were chiefly from general hospitals ranging in size from 220 to 2600 beds and included only two tax-supported institutions—in other words, the majority of the group had fairly liberal budgets. Even before rationing, however, the food budget of every hospital was limited. With the advent of food rationing and the many substitutions necessary to maintain an adequate diet, there has been, unfortunately, a sharp rise in food costs to complicate an already difficult situation.

[1] Presented before the American Dietetic Association, Pittsburgh, October 21, 1943. Miss Hedgecock is dietitian of the University of Maryland Hospital, Baltimore.

Answers to the questionnaire indicated a 20 per cent increase in the average number of meals served to patients in April over December of the preceding year. This seems to prove the oft-mentioned statement that December, the basic month selected by OPA for calculation of allotments, shows about the lowest patient occupancy of any month in the year.

The difficulties most frequently encountered under rationing were: first, the shortage of help, especially to prepare the extra amounts of fresh, unrationed produce; second, insufficient points for processed foods, frozen foods and patient nourishments; and third, the difficulty in procuring foods. Following closely on the heels of these problems were: unavailability, high prices, and inferior quality of fresh fruits and vegetables; criticisms and behavior problems among patients and personnel due to restrictions and lack of understanding that hospitals are also rationed; unavailability and high cost of poultry, meat and fish; generally high prices; insufficient points for meat; necessity for decreased variety in menus and last-minute menu changes; and difficulties resulting from delay in deliveries.

Some specific adjustments to the difficulties were listed. Meals served to patients' guests, visiting and guest physicians, and guests of personnel have been restricted or eliminated in most hospitals, as has the privilege of choice on private patient menus. The service of food at social functions has also been greatly curtailed.

The use of sugar, the first food to be rationed, has been reduced to an average of 69 per cent of normal consumption and an average of 50 per cent of this amount is now used in baking. These figures seem to indicate that the allowance of sugar is adequate although the use of substitutes appears to have been necessary in some hospitals. Twenty-three per cent of the hospitals surveyed planned to process some food this year. Lack of labor was mentioned in several instances as the reason why it is difficult, if not impossible, to can a specified amount of the food needed by the institution.

Shortage of processed foods seems to present one of the most difficult problems of rationing, as 65 per cent of the hospitals have not been able to make completely satisfactory substitutions for processed fruits and vegetables, due chiefly to lack of sufficient substitutes, shortage of help to do the extra preparatory work required, higher prices, and in some instances lack of storage space or inadequate equipment for preparation. Frozen fruits and vegetables could not be used as substitutes, since 90 per cent of the hospitals experienced difficulty in obtaining them in unrationed packages. It is interesting to note that 48 per cent of all processed food obtained is used for therapeutic diets.

The average number of times meat is served each week has been reduced from 11 to 7. The summary shows that the majority of hospitals purchase meat by fabricated cuts instead of by the carcass, and that 16 per cent of all meat served is for special diets. Hospitals receive an average of 61 per cent of their December consumption of meats and fats. Since rationing, privilege of choice of meats for patients and personnel has been restricted or discontinued. Special attention should be called to the average standard amount of protein, 74.33 gm., used in estimating protein value of menus; of this amount, an average of 57.5 per cent ordinarily comes from animal sources.

In all the hospitals reporting, rationing has made it necessary to reduce the service of foods fried in deep fat. In 90 per cent of these hospitals, rationing has affected baking operations. Before rationing, all the hospitals prepared their salad dressings; only 70 per cent are continuing this practice.

The amount of milk and eggs used is worthy of note. Patients receive an average of 21.37 oz. milk daily; the employees, 17.7 oz. The average per capita daily consumption of fresh eggs is 1.3, showing an increase of 83 per cent since rationing.

Many adjustments have been necessary, those most often cited concern the restricted use of rationed foods. Other adjustments have included the following: the increased use of meat substitutes and extenders; per capita restrictions of rationed foods such as sugar, coffee, and butter; generally simplified food service; meatless days; closer food control through menu planning; use of coffee extenders during rationing of this item; revision of recipes; revision of food production procedures; new work schedules; money allowance for personnel meals; prompt repair and routine servicing of food service production equipment and renewal when possible; intensified use of leftovers; the use of psychological means in adjusting the clientele to changes in the menu through the use of notices listing rationed items and the restrictions thus imposed; changes in food purchasing procedures; establishment of a record system to maintain points used for personnel at consumer level, and to assure use of extra points for patients only; and conversion of nurses' cafeteria to pay cafeteria. Specific adjustments have been made to meet the problem of shortages in rationed items such as butter, fats, and sugar. The most rigid adjustment, that with regard to butter, has been effected by a general restriction in the amount served to both personnel and patients, accomplished by means of cutting more pats to the pound, omitting its use in cooking, and the increased use of substitutes such as margarine, jam or jelly, and peanut butter. Decrease in the use of other fats has been effected by deep-fat frying restrictions, elimination of small pastries and two-crust pies from the menu, increased use of bacon fat and rendered fats, revision of recipes to reduce the use of scarce fats and substitute the less scarce, decreased use of oils in salad dressings, and restrictions in the amount of baked goods which demand considerable fat.

One final test of any meal served, of course, is the following: "Is the diet adequate from a nutritive standpoint?" Of the hospitals reporting, 90 per cent have managed to maintain their diet at an adequate level. This is gratifying, but one must remember that the hospitals answering the questionnaire were almost all private hospitals. These hospitals have operated on budgets with a sufficient margin of choice to permit shrinkage; service of meat, as stated, has been cut merely from 11 to 7 times a week. What of the county and state institutions where meat, in prerationing days, was never served more than 6 times a week? A consideration of their operation under rationing on a percentage basis causes grave concern as to the nutritional adequacy of the food served.

The solution to our common difficulties is not yet in sight. We can hope for an increase in points, special consideration for the needs of hospitals, or a separate group classification. In the meantime our chief consolation lies in the undeniable fact that everyone faces the same problems.

INSTITUTIONAL EQUIPMENT IN WARTIME[1]

ETHAN A. SCHOLNICK

Food service equipment and personnel in relation to the operation of a hospital occupy a position of importance second to none. Without adequate facilities for the preparation and service of food, the functioning of a hospital is seriously impaired. In the early history of hospital development the location and arrangement of kitchen facilities appeared to be only the result of an afterthought—a consideration secondary to the entire plan, in which an assemblage of appliances was purchased with what was left of the budget and haphazardly placed in some left-over and overlooked, so to speak, portion of the structure.

In recent years hospital planning has given due consideration to the importance of food preparation and serving equipment. The smoothly functioning institution in its attempt to perform at maximum efficiency has incorporated in its set-up kitchen equipment of the most modern character, designed for durability, sanitation, safety, performance, economy of labor, and elimination of food waste. First thought is given to the most suitable location for easy operation of the various services, including delivery conveniences, storage facilities, space required, location for convenient functioning, type of service most suitable for patients and personnel, ventilation, waste disposal and the like. The final result, the modern well-planned hospital kitchen, can be pointed to with justifiable pride.

During peacetime manufacturers had developed equipment embodying many refinements, and materials were unrestricted. Now, these materials have been drafted for the munitions and implements of war. Beginning two years ago and increasing rapidly in intensity, there have been an almost complete shut-down on purchases and gradually intensified restrictions on equipment. Rationing followed, beginning with an A-10 preference rating and followed by the AA group. Firms in the kitchen equipment industry were forced to abandon outside solicitation and devote almost their entire effort to industrial and governmental agencies. Stocks became depleted. Markets for used equipment were dissipated. Finally the demand for ship galleys compelled manufacturers to refuse orders for shore installations. Many national products were completely withdrawn for the duration, others were put through simplification processes in which variations in styles, shapes and sizes were reduced to a minimum. As required by WPB Directive for Wartime Construction, May 20, 1942, "All construction shall be of the cheapest, temporary character, with structural stability only sufficient to meet the needs of the services which the structure is intended to fulfil during the period of its contemplated war use."

It has been a matter of interest to me to observe three distinct reactions to the directives and prohibitions affecting wartime food storage, preparation and serving facilities among those directly involved.

One group, by no means few in number, fail to take cognizance of the true state of affairs, believe they have only to order and receive whatever they choose in abundance, discount the impossibility of obtaining any commodity with dispatch and look with disdain on those who inform them to the contrary. They have an air of optimism; since the war is going so well on distant shores there is no justification for these restrictions. They little realize that the attack on Hamburg which devastated the city, cost us, in addition to loss of men, 74 million dollars. This amount was lost in one night in matériel alone, and should convey some idea of the demands now made upon our resources.

A second group, in the minority, have made a conscientious effort to interpret the true intent of the regulations, and to comply with them in all respects. They are conversant with the mandatory restrictions, understand in a measure the prescribed regulations for permission to replace and add necessary new equipment, and shun

[1] Presented before the American Dietetic Association, Pittsburgh, October 21, 1943. Mr. Scholnick is President, Bernard Gloekler Corporation, Pittsburgh.

with horror the patronage of black market racketeers. They realize, too, that the Food Service Equipment Industry, with more than 110 approved members representing dealers in all parts of the nation, is constantly making a concerted effort to remedy inequalities and to alleviate hardships by direct negotiation with WPB.

A third group, the largest by far, represent the uninformed. Because of their difficulty in obtaining and interpreting the multitudinous and ever changing regulations, they are in doubt regarding the relief to which they are entitled. They require guidance and assistance in clarifying some of the existing problems.

Recently new agencies and departments have been established, largely at the instigation of the members of the Food Service Equipment Industry, to alleviate conditions by delegating one department to handle all food service problems. For many months OPA, together with medical authorities, has been studying the hospital problem with a view to developing uniform procedure covering the granting of special concessions to hospitals. They realize that the ever increasing use of hospitals by the general public is certain to continue when the services of professional personnel are again available on a peacetime scale. Expanded public health programs are featured prominently in postwar plans and in discussions of broader social security coverage. Hospitals of a permanent character will be needed to take care of war veterans. New facilities in all departments will be required by reason of practices developed and enlarged during the war period.

In my opinion, the situation now appears much brighter than it has for some time. Many commodities in the early part of our wartime effort were completely withdrawn from the market, except for government agencies and some industrial institutions. No provision had been formulated for releasing vital equipment to hospitals under any conditions. Today, as I see it, we have, in a sense, a system of rationing whereby hospitals may obtain equipment and materials by following a prescribed procedure; namely, application to the proper departments of WPB for permission to release such materials and equipment. Experience has proved that full consideration is promptly given to these requests in all cases where the circumstances justify, and permission to release is granted without delay. The most commonly used application forms in our industry are covered by the following limitation orders:

Limitation Order L-182 applies to commercial cooking and food and plate warming equipment. More specifically, it includes new or used equipment using coal, wood, oil, gas, or other non-electric fuel for the heating agent, designed for the heating of kitchen utensils or plates, or for the cooking or baking of food for consumption or sale on the premises in which the equipment is located. It includes, but is not restricted to such items as bakers, broilers, fryers, griddles, grills, hot plates, ovens, ranges, roasters, steamers, toasters, urns, and warmers. Any person may make or accept physical delivery of any such equipment pursuant to specific authorization of the Director General for Operations on Form WPB-1529, formerly PD 638A. Under this regulation the dealer is required to present this form in triplicate to the Plumbing and Heating Division at Washington.

Limitation Order L-248 applies to commercial dishwashers, and embraces any new or used mechanical devices designed for washing dishes, cutlery, glassware and kitchen utensils in establishments where food is prepared for consumption or sale on the premises. Under this regulation the dealer is also required to file formal application on Form WPB-1529, formerly PD 638A, to the Plumbing and Heating Division.

Limitation Order L-38 applies to any new or used refrigeration or air-conditioning systems consisting of an assembly or combination of machinery, equipment, or combination of machinery and equipment or other apparatus designed primarily to lower the temperature of, or remove vapor from gaseous, liquid or solid matters directly or indirectly, by mechanical, chemical, or physical means. More specifically, as applied to our industry, it embraces primarily refrigerators and water coolers. Under this regulation the purchaser makes application direct to Washington, and is required to submit 3 executed copies of Form WPB-2449, formerly PD-831, for approval.

Limitation Order L-65 applies to new or used electrical appliances which have as functional parts electrical heating elements of any wattage, or which are powered by an electrical vibrator or electrical fractional horsepower motor. It includes, but is not limited to coffeemakers and commercial heavy duty equipment such as broilers, food choppers, mixers, grinders, servers and slicers, fry kettles, griddles, hot plates, juicers, ovens, ranges, urns, and vegetable peelers. Under this regulation the manufacturer is required to make formal application in quadruplicate to Washington on Form WPB-1319, formerly PD 556, for permission to release.

These application forms in many cases are sufficient in themselves to secure equipment and in many instances the need of special priority assistance is eliminated. In the preparation of all these application forms, the ultimate user or purchaser must furnish at least part of the information required, but food service equipment dealers should be called upon to help in the accumulation of this information because of their intimate knowledge and experience with the procedure. It must be remembered, too, that the approved form is finally returned to the ultimate user and must then be forwarded to the dealer for further processing.

In addition to this present plan of relief, diligent efforts are being made to improve conditions further by those responsible for the regulations affecting our industry. Certain inequalities prevail for which remedies doubtless will be invoked. I would like to point out some of the modifications recently placed in effect and others now under consideration.

The new Maximum Price Regulation #429, effective September 1, 1943, fixes retail ceiling prices for used consumer durable goods exclusive of ice boxes and refrigerators. If the article contains all parts necessary to make it fully useful, is in good working condition for the purpose intended without further repair, is clean and has a good appearance, it is priced at not more than 75 per cent of its value when new. If the condition does not meet the above description, the ceiling price is 33⅓ per cent of its value when new.

Plans are under way to improve the quality of tableware. It is expected that a nickel undercoating or copper flash-plate will be permitted in producing carbon steel tableware in order to seal the pores and thereby produce a fairly satisfactory "Victory" construction. It is believed that four items only are to be approved: teaspoons, dessert spoons, knives and forks.

Because of the threatened shortage of natural gas, the shortage of cartons, and the uncertainties with regard to needed materials and manpower, it is thought that all non-essential and fancy items of chinaware and glassware will be eliminated. This simplification program, already in effect for many other lines, should aid deliveries considerably.

Rumors are current that aluminum is becoming more plentiful. Production is heavy, but factories have been unable to maintain working staffs to keep up top produc-

tion. It is thought that relief may arrive during the first quarter of 1944.

It has just been reported that the Consumers Durable Goods Division of WPB will now permit pipe or angle iron to be used for supports of all types of tables, sinks, steam-tables, bain-maries and urn stands. Supports are understood to mean legs only; the shelves, drawers, and other parts must continue to be made of wood. Prior to this, the use of wood was required for all under-structures.

The information presented herewith is based on that gained during long and intimate association with these problems. It must not be construed as official, however. The scope of the information is necessarily limited, but should added information be desired or clarification of issues in connection with the subject matter herein treated, I will be pleased to furnish authentic rulings upon request.

THE DIETITIAN'S AIDE PROGRAM PROVES ITS WORTH[1]

KATHRYN A. McHENRY

The group of 26 women who completed the Red Cross Dietitian's Aide course at the Veterans Administration Hospital, Hines, Illinois, which was described in this JOURNAL for September, has since rendered 2500 hours of volunteer service in spite of summer vacations, children home from school, and volunteer service activities in which they were active prior to the establishment of the Dietitian's Aide Corps.[2]

The Chicago Dietetic Association appointed a committee in August of this year to develop, in cooperation with the Red Cross, Dietitian's Aide courses in local hospitals. Many dietitians perhaps still feel that they are too burdened to undertake additional teaching. Our experience, however, has been encouraging, for we have found the aides of great assistance in supplementing our work in the face of the ever mounting manpower shortage.

A review of every dietitian's responsibilities might profitably be made to determine what part of these could be assigned to a Dietitian's Aide. The number which should be trained could then be determined. Preparatory to this one should ask one's self, "If I were to take my best employee, one with at least a high school education, give her the 20-hour nutrition course, and the 40-hour Dietitian's Aide course, what part of my duties could I then conscientiously assign to her?" Bear in mind when answering this that the Dietitian's Aide is a volunteer. She is giving freely of her time, without remuneration, as her contribution to the war effort.

When you have answered this question you may feel it incumbent to train aides and, as a result, to share your professional staff with the hospitals which are less well staffed. You will then have a better opportunity to look ahead and build for the postwar days and that unprecedented hospital load which we all expect. Diseases peculiar to other countries may be brought to us as well as the many sick and wounded service men and women. One and all will be concerned with nutrition.

The Chicago committee considered having the lecture work for the aides given by a Red Cross instructor at Red Cross Headquarters and the practical work at the hospitals where the aides would later go on duty. At present it appears that each hospital which expects to use the services of aides will have its staff give the complete course with the assistance, perhaps, of retired staff members. In this way the lecture and practical work can be synchronized as much as possible.

With regard to the services rendered by volunteers in the hospital, it should be emphasized that this discussion pertains to Dietitian's Aides only, a group which should not be confused with canteen workers. A Dietitian's Aide is one who has not only met the educational requirements of an established course but has proved to be adaptable to hospital ethics and discipline, a fact which should be determined while the course is being given and before a certificate is awarded.

In our use of the services of Dietitian's Aides, appropriate ethics for their guidance has probably been the most discussed subject. Incidentally, the mastery of theory presented no serious problem since with one exception all of our aides had had two years or more of college work. Hospital routine, however, was as new to the aides as the aides themselves were a new experience to the hospital! It was necessary, first, to establish a well-defined place for them. Lesson No. 2 on orientation introduced them to the charts of organization of the hospital and the Dietary Section. It enabled them to meet many members of the professional staff. It defined the position they were to occupy at the point where it had been established. They, in turn, brought with them a spirit of service, a spirit which we tried to foster by making them confident that they were sorely needed.

A brief history of the hospital, its purpose, statistics concerning the work load, bed capacity, number of employees, etc., was then presented. Hospitals for our service men and women are near to the hearts of all, since it is to these hospitals that we look for the care of relatives and friends now in the armed forces. The aides were very mindful of this.

Instructions regarding schedules, work, and duties should be stated in writing, and perhaps incorporated in a small handbook. At least a check sheet of duties should be supplied. It is well to bear in mind that the aides work only one or two days a week and memory therefore should not be relied on solely. Some objections to aides, in fact, have been made on the basis of "What good can anyone be who comes to work only one day a week?" In reply it may be said that the aides will be only as useful as we make them—as determined by careful selection, training, and supervision, with emphasis on supervision both during and after the training period. It has been found that their intelligent service offsets their lack of frequency in attendance. Their only reward as volunteers is the satisfaction of having contributed something. Their individual contributions may not be great but they gain in magnitude because of the spirit in which they are offered.

Organizations having a standard set of rules for professional personnel will no doubt find that these can be applied to the aides, who in reality are professional assistants since they visit patients and have access at times to confidential material. They should be instilled with a sense of professional loyalty to the organization and an understanding of the limitations of their field of work. For example, an aide asked if she might write a letter for a patient. The answer was, "No, that activity belongs to another group." "But what can I do to avoid hurting his feelings?" she asked. "Tell him that, and also that your time while here is pledged to dietary activities, and

[1] Presented before the American Dietetic Association, Pittsburgh, October 19, 1943. Published with permission of the Medical Director, Veterans Administration, who assumes no responsibility for the opinions expressed.

[2] A report on the status of Dietitian's Aide courses by Melva B. Bakkie, Director, Nutrition Service, National Headquarters, American Red Cross, Washington, states that up to October 11 a total of 37 classes had been completed in hospitals throughout the country, 18 additional classes were under way, 525 certificates had been issued, and 131 Dietitian's Aide instructors authorized.

that you do not visit patients in any other capacity during work hours."

Regular attendance and punctuality should be expected of the aides. The problem "How long should an absent volunteer be carried on the roll?" will no doubt be decided by each hospital. The cause of absence is usually the deciding factor. Two of our aides, for instance, had valid reasons—sprained ankles. Should indifference be determined as the cause of absence, grounds for dismissal would probably be indicated. Regulations regarding telephone calls, smoking, medical service, etc., could be determined by those already in effect for other personnel. It is important to define and interpret rules, regulations, and ethical procedures for the aides as early as possible during their training. The captain of the corps can be very helpful in assisting the dietitian with this part of the program.

A group discussion on approved behavior on duty proved worth while. The aides were told that it is important to develop a quiet manner though not necessarily an uncommunicative one, and that an unhurried attitude free from the element of excitement is in keeping with hospital atmosphere.

Attitude toward employees as well as toward patients must be studied. It is not easy to bring people, many of whom have never been employed, into a group of which the greater number have always had to work for a living. When questions of social and possibly economic differences in status and race arise, about the only restraining measure has been to try to teach those who believe they are most gifted and intelligent that if this is so, they should help to dignify the lot of labor and that of groups considered less fortunate and try to understand their problems.

Parallel with the problem of adjustment of the Dietitian's Aide to the hospital organization, is that of duties to be performed. The Red Cross instructor's outline contains a very comprehensive list which in its entirety may not fit the need of a specific unit, but from this list the duties which do apply can be selected.

In accepting the services of aides it should be kept in mind that their greatest interest, and properly so, is in the patient. This enhances their value in checking trays and in visiting patients. To this activity they bring not only a new note of interest for the patient who may have become jaded with hospital routine, but they also give the patient a closer link with the outside.

The outline of duties states that the aide may "visit the patient with the dietitian and record food preferences." It has been found that many aides after suitable experience can successfully take over the duty of visiting patients without the dietitian's immediate supervision. As the shortage of dietitians becomes intensified there appears to be no reason why the aide cannot take over, under adequate direction, some part of the bedside instruction. This is particularly true where corrective measures are being taken for faulty eating habits.

The aides receive intensive instruction on the normal or foundation diet, and do very well on this phase of the work. In the face of rationing we were distressed at the amount of butter returned on trays. Upon inquiry, it was learned that a number of patients said they didn't eat bread and had therefore not eaten the butter. We asked the aides to remind the patients that if they did not care for bread, the butter could be put in the cream soup, or on potatoes or other vegetables, so that they would not lose the nutritive value of the butter. We anticipate that in the future the aides will be of increasingly greater service in visiting patients.

We were pleased to discover that the aides can be made to feel a considerable sense of satisfaction in participating in the routine procedures of a kitchen, in seeing that the patient receives a satisfactory diet, and in the clearing and cleaning which must follow. They wish to make as great a success of their corps as the Nurse's Aides have made of theirs.

Many ask, "What will happen to Dietitian's Aides when the emergency is over?" Most of them, no doubt, will gladly return to their homes and their community life. But through those channels, we hope, they will spread the information on nutrition which we have taught them and thus render an important postwar service.

THE RED CROSS VOLUNTEER'S VIEWPOINT[1]

MRS. GRAHAM DOUGHERTY

The Dietitian's Aide program was born of a great need which resulted in calling on many Red Cross Canteen Corps to help out in the war emergency. This help, freely given, consisted of greatly varied types of work. As a result of this lack of uniformity, a committee representing the American Dietetic Association and the Nutrition Service of the Red Cross met to discuss the type of training that would be most useful to women interested in giving their services, and the duties they might reasonably be expected to perform in hospital dietary departments.

The advisability of working with a professional group was immediately recognized by the Red Cross Volunteer Special Services, and with the authority of their Administrative Committee a new war emergency corps, known as the Dietitian's Aide Corps, was authorized. These volunteers were to have 20 hours of standard nutrition instruction and 40 hours of further training, to be broken down into 25 hours of discussion and demonstration and 15 hours of practical work supervised by a dietitian in a hospital. Very liberal allowances were made for women who had already been doing similar work as members of a Canteen Corps, for it was desirable to establish this new corps as easily and quickly as possible without interrupting the services being given.

At this point two unexpected developments occurred: first, Canteen Corps members who had been working in hospitals rather resented the fact that they could not carry on under the old system and second, many dietitians encouraged this by telling them that their work was satisfactory and they did not need any further training. All this appeared to arise from misunderstandings on both sides which have since been satisfactorily adjusted.

I sincerely believe that volunteers feel a greater responsibility toward their jobs than do many professionals, and it is only now after years of effort that their worth is fully appreciated and a true evaluation is being made. With training these women can be of inestimable help to the dietitian. One inefficient or poorly adjusted volunteer, of course, can ruin the reputation of a whole group, for all alike must share in the blame. This does not always hold true for professional groups, who are more apt to be judged on an individual basis. At times, too, there have been jealousies between paid and unpaid staffs. This also is a result of mutual misunderstandings. Let me urge you to take the volunteers into your confidence, tell them what you expect and why, for if you share your responsibility with them and they understand the part they are to play, you will be well repaid in loyal service.

Because of the great need, the Red Cross is willing and eager to recruit and partially train these women to help

[1] Presented before the American Dietetic Association, Pittsburgh, October 19, 1943. Mrs. Dougherty is Assistant Director, Volunteer Special Services in charge of Dietitian's Aide Corps, American Red Cross, Washington.

you. I say "partially train" because the Red Cross nutrition course is a prerequisite of the Dietitian's Aide course.

The procedure of setting up a Dietitian's Aide Corps is as follows: first, a request from the hospital is sent to the Volunteer Special Service Corps of a chapter. The Volunteer Special Services, through the local nutrition chairman, will then arrange for training. The hospital dietitian, hospital superintendent, and Dietitian's Aide chairman should confer and decide just what duties can be delegated to the aides. Volunteer Special Services recruits for the Corps, and the Nutrition Department supervises the training and approves the instructors. There should be very close cooperation between these groups and complete understanding of just what is being done and just how great a need exists in the hospital.

It is a privilege for Dietitian's Aides to work with such a splendid professional group, and I feel sure that it is an association they will treasure all their lives. Like the Nurse's Aides they will be a connecting link between the dietitian and the community which is often ignorant of her work. Also, in any future emergencies the dietitian will have well-trained women to call upon.

In conclusion, I wish to say that this service was conceived and developed only with the idea of being helpful in the war emergency, that we fully realize how heavily burdened all hospital dietitians are, and that we admire you tremendously for the way in which you are carrying on. We want you to realize that you have a tremendous source of help at your door—that by a request from your hospital to the local Red Cross chapter this help can and will come. I am sure that the interest and steadfastness of those who give this service will repay you many times for your work in training them.

A WORK PROGRAM FOR THE DIETITIAN'S AIDE[1]

MIRIAM C. CONNELLY

Since the University of Maryland Hospital at Baltimore graduated one of the first classes of Dietitian's Aides (*see* p. 575 this JOURNAL for August), perhaps our experience may be of some help to others.

The first four lectures of the course were given by Mrs. Joseph B. Lambert, Director of Nutrition, Baltimore Chapter, American Red Cross. The remaining lectures and lesson plans were given at the hospital, and the final examination at the Baltimore Red Cross Headquarters. Each staff member of the Dietary Department instructed the group in the various duties of the unit. In our first class we had 23 volunteers. They were allowed the privilege of choosing the day most convenient for them from Monday through Friday. This arrangement was very satisfactory since we had no more than 4 students each day. If a volunteer could attend more than one day a week she was allowed to finish the course as soon as possible. The enthusiasm of the group was very encouraging and helpful to the staff of instructors. The women displayed keen interest for they realized the hospital had definite and urgent need of their services. Of the 23 who completed the course, 6 have been serving regularly in the hospital; 4 others have served in hospitals closer to their homes; and several began regular volunteer work in October.

We have found the Dietitian's Aides, under the supervision of the dietary staff, of great help. Their services may be outlined as follows:

In the Main Office of the Dietary Department: 1. Handling telephone messages. 2. Typing recipes, requisitions, time schedules, file cards, and menus. 3. Recording bills, sorting, and filing. 4. Arranging employee records. 5. Checking requisitions on cost accounting cards. 6. Recording menus in permanent record books. 7. Mimeographing.

Duties in the Main Kitchen: 1. Preparing simple desserts, and fresh fruits for desserts and breakfast. 2. Counting portions for food carts. 3. Helping prepare and bake desserts made in the bakery, such as shortcakes, muffins, prepared mixes, and pastries. 4. Assuming responsibility for leaving work unit in order. 5. Assisting the food cart service for private and ward floors through checking orders and food leftovers on carts after meals have been served. 6. Preparing salads for dining room and private floor trays. 7. Aiding in housekeeping through checking operation of equipment. 8. Assisting student in checking contents of refrigerator. 9. Checking orders requisitioned from storeroom.

Duties in the Dining Rooms: 1. Care of equipment and its operation. 2. Receiving telephone messages. 3. Assisting in food preparation by (a) preparing salads for nurses' dining room and arranging for serving, (b) assembling cold foods on proper dishes for service, (c) arranging bread, butter, and milk on counter. 4. Assisting during the serving period in dining room and at the steamtable counter by (a) serving soup, main dish, and dessert, (b) replenishing bread, butter, and milk supply, (c) replenishing food when necessary, (d) taking care of trays for personnel who require special diets, (e) seeing that trays, napkins, and silver are on hand, (f) supervising waitresses and seeing that soiled dishes and trays are removed from the dining room. 5. Being responsible for the appearance of the dining room. 6. Supervising the serving of food in the employees' dining room and maintaining the smooth running of the service.

Duties in Diet School: 1. Working in nourishment center by (a) sending intermediate nourishments to all hospital floors, (b) preparing eggnog, fruit juices, and chocolate syrup, and (c) squeezing oranges. 2. Preparing special foods (a) baked custards, junkets, and jellos, (b) diabetic ice creams, custards, jello, puddings, and mineral oil mayonnaise, (c) birthday cakes for patients, (d) meats for special diets, and (e) cereal gruel, tube feeding, Ravdin liquid, gelatin solution, and malted milk. 3. Assisting in setting up and checking special diet trays for all floors. 4. Weighing out food for calculated diets and assisting in the preparation of each calculated tray. 5. Checking and summarizing special diets. 6. Checking and summarizing diabetic and calculated diets. 7. Assisting in general housekeeping assignments by (a) checking contents of refrigerators, (b) unpacking and putting food away, (c) cleaning shelves and drawers, (d) operating and cleaning Hobart Mixer and attachments, meat grinder, fruit juice squeezer, and gram scales. 8. Receiving telephone calls for special orders and preparing them. 9. Studying diet manuals and learning to write special and calculated diets. 10. Analyzing diets. 11. Recopying special diet cards. 12. Mimeographing and checking special forms for diets. 13. Typing special diet instructions for patients.

It is a pleasure to have the volunteers with us because of their cheerful cooperation and interest in our work. It is particularly gratifying to note their desire to be kept continually busy, all of which indicates the wholehearted spirit with which the members of the Dietitian's Aide Corps work. Mrs. Lambert reports that "the Dietitian's Aides are most enthusiastic about their work." It is very evident, judged by the opinions of other dietitians in Baltimore who have worked with the Dietitian's Aides, that their contribution has been invaluable.

[1] Presented before the American Dietetic Association, Pittsburgh, October 19, 1943.

MEDICAL DEPARTMENT DIETITIANS APPOINTED IN OCTOBER 1943

As stated previously in this JOURNAL, it is no longer possible to list the post of duty to which Army dietitians are assigned. This list of appointments, therefore, includes information in the following order: the name; the college or institution from which academic degree was received; and the civilian or Army hospital at which training was completed. Appointees for whom no training course is listed have been accepted on the basis of "qualified experience."

Barrack, Grace Edith: University of Alabama; Beth Israel Hospital, Mass.
Bartlett, Marian: University of Nebraska; Michael Reese Hospital.
Bilson, Barbara Jeanne: University of Cincinnati; Cincinnati General Hospital.
Brandon, Marialta: University of Iowa; University of Iowa Hospitals.
Church, Margery Lois: University of Washington; University of Washington Administrative Course.
Churchill, Evelyn Maxine: University of Vermont.
Cooney, Helen Fern: Oregon State College; Grasslands Hospital.
Corbett, Nina Leolian: Coker College, S. C.
Engebretsen, Nancy Ann: University of Wisconsin; Johns Hopkins Hospital and Percy Jones G. H., Mich.
Faricy, Eleanor Patricia: College of St. Catherine, Minn.; Ancker Hospital.
Finch, Mary Sibley: Hood College, Maryland.
Foster, Roberta Louise: Siena College, Tenn.; St. Anthony's Hospital, Okla.
Fredlock, Jessie Rebecca: Texas State College for Women; University Hospitals, Cleveland.
Garn, Mada Celia: Ohio State University; University of Minnesota Hospitals.
Garner, Mary Jane: St. Joseph's College, Md.; St. Mary's Hospital, Mich.
Gruel, Joyce Elizabeth: University of Montana: Montefiore Hospital, N. Y.
Harrington, Corinne Meyer: Oregon State College; Johns Hopkins Hospital.
Harris, Joanna Sharp: University of Maine.
Hershey, Miriam Adele: Albright College, Penn.
Horton, Lucille Gertrude: Framingham State Teachers College, Mass.
Hunt, Nellie Virginia: Berea College, Kentucky.
Irvine, Marian Areis: Cornell University; Albany Hospital, N. Y.
Jared, Frances Jean: University of Washington; Massachusetts General Hospital.
Justin, Ruth Esther: Stout Institute; Ancker Hospital.
Knerr, Adele: Oregon State College; Johns Hopkins Hospital and S. H., Ft. Lewis, Wash.
Leidy, Edith: Western Maryland College.
Maher, Virginia Elizabeth: Marymount College, Kansas; Good Samaritan Hospital, Ohio.
Mason, Angela Patricia: St. Joseph's College, Md.; St. Mary's Hospital, Mich.
Morissey, Martha Jane: New York University; Philadelphia General Hospital.
O'Hanlon, Wilda Fern: Florida State College for Women.
Pfluke, Eleanor Nina: University of Wisconsin.
Reimers, Eleanor Ruth: University of Nebraska; Mercy Hospital, Ill.
Scripture, Charlotte Rosamond: University of New Hampshire.
Seckinger, Gertrude Regene: Michigan State College; Indiana University Medical Center.
Sexauer, Berenice Margaret: University of Illinois; Seattle Course for Student Dietitians.
Smith, Carolyn Edith: Hunter College; Starling-Loving Hospital.
Sneller, Emelia Elizabeth: Florida Southern College; Watts Hospital, N. C.
Stephens, Flora Virginia: Madison College; Medical College of Virginia.
Swink, Eunice Cleo: DePauw University; Women's Educational and Industrial Union.
Thor, Norma Oresta: University of Minnesota; Michael Reese Hospital.
Upham, Eleanor Davis: Framingham State Teachers College.
Voorhees, Abbie Annette: University of Illinois; Michael Reese Hospital.
Wang, Dorothy Lucille: Mount Mary College, Wis.; Watts Hospital, N. C.
Williams, Mary Anita: Temple University; Pennsylvania Hospital.
Wood, Alice Lincoln: University of Wisconsin; Grasslands Hospital.
Zambrano, Louise C.: Carnegie Institute of Technology.

Nutrition Program Materials

Several new pieces for use in community nutrition programs have been received from the National Dairy Council, in addition to those described under the news section of this JOURNAL. Chief among these is a striking chart in colors showing "protein equivalents" in terms of quantities of familiar foods. On the back of the chart, high-quality and incomplete proteins are defined, and combinations of foods which would supply adequate amounts of protein for adults and children are given. Other explanatory notes are furnished, such as the body's need for protein. In a booklet entitled "Speaking of War-Fare" this chart appears in miniature, along with one demonstrating amounts of foods necessary to furnish the same amount of calcium as one quart of milk, and another showing foods that supply equivalent amounts of riboflavin. The booklet also contains 5 "menu-minders" for war-fare and a few recipes for appropriate wartime dishes.

A series of attractive charts entitled "Building Blocks of Foods" is also available from the National Dairy Council. These have been carefully prepared and contain information comprehensible to the layman concerning thiamin, vitamin A, vitamin C, calcium, phosphorus, and vitamin D, proteins, carbohydrates and fats, iron, riboflavin and nicotinic acid. Combinations of foods, in specified quantities, which supply adequate amounts of the nutrient in question for both children and adults are suggested on each chart, as well as a daily meal-planning pattern designed to supply an adequate amount of specific nutrients and all of the body's other food needs. Suggestions for leaders in using the charts are furnished by Dr. Eva Donelson and Katherine Wismer, Division of Home Economics, University of Minnesota. Other materials are: a booklet "Lunchtime on the Home Front", useful for industrial nutrition programs, and two small folders for the same purpose, "Check Your Lunch Today" and "Your Lunch Box." A leaflet for general distribution is called "More Years of Living" and contains a "vitality rating" score sheet.

The WFA has published a complete set of campaign materials for a nutrition program for industry, accompanied by an "office manual" addressed to plant executives, in the introduction of which it is stated that "many organizations have found it advisable to hire a full-time dietitian." The materials include 4 posters; a folder, "Eat a Lunch That Packs a Punch"; and 7 "table tents" illustrating each of the basic food groups, all of which are available from the Superintendent of Documents at prices listed in the office manual. The manual may be obtained on request from FDA regional offices.

Teaching materials on the "nutritionally adequate breakfast" have been received from Agnes C. Reasor, Home Economics Director, Cereal Institute, Inc., 135 So. La Salle Street, Chicago 3. Included are: the leaflet, "What Is a Good Breakfast?" previously mentioned in this JOURNAL; a wall panel showing the constituents of an adequate breakfast and listing foods and food combinations suitable for inclusion in such a breakfast; a student's notebook folder to be used in classes in nutrition and home economics; and a teacher's manual explaining the use of these and suggesting classroom problems concerning breakfast menus. Other useful material recently published by the Cereal Institute are a booklet "It's News on Menus" for use in preparing restaurant menus, and "Better Breakfasts" which contains sales, display and advertising ideas for promoting a campaign for better breakfasts.

Book Reviews

An Introduction to Foods and Nutrition. By Henry C. Sherman and Caroline Sherman Lanford, Columbia University. New York: The Macmillan Company, 1943. Cloth. Pp. 292. Price $2.

This latest addition to the list of books by Dr. Sherman and his daughter is directed to "anyone interested in foods and nutrition whether or not with a background of previous study of science." It is written in answer to the need for "a thoroughly serviceable acquaintance with the actual articles of food," so that intelligent control of household budgets can confer nutritional benefits.

The contents are divided into four sections and an appendix, namely: Individual and National Importance of Nutrition; The Maintenance of Good Family Nutrition: Differences in Need Due to Age, Sex, and Occupation; Foods: Their Properties, Preservation, and Preparation; and Planning of Meals and Management of Food Supplies.

The book is written in the Shermans' inimitable style. There is very timely stress on the place of vegetables, fruits, and grain products in a wartime diet, and due attention is paid to methods of preparation designed to retain nutritive values. Other excellent and very practical features in a book of this type are the chapters on meal planning, the budgeting and purchase of food, and planning the yearly food supply for the family, including gardening, the conservation of home-grown food, etc.

Helpful, too, are the annotated lists of references to each chapter, a glossary of terms, and unusual and the usual tables of food values and other data. It is, of course, a book that can be wholeheartedly recommended for its stated purpose.

Cook It in a Casserole. With Chafing Dish Recipes and Menus. By Florence Brobeck. New York: M. Barrows and Company, Inc., 1943. Cloth. Pp. 181. Price $2.

This is an excellent and timely book. It really helps to answer the problems of shortage of metal pots and pans, labor, and foods. For cooking in a casserole means the use of glass or pottery and a tasty way of using up odds and ends of food. The service of food is expedited and hot foods are more likely to be served hot, attractively, and appetizingly.

The author, well known to home economists as a former editor of the *Herald Tribune* Home Institute and for her written contributions elsewhere, groups her menus as casserole soup suppers, fish dinners en casserole, and eggs en casserole, the alimentary pastes and rice en casserole, and chicken, meat, and vegetable casserole dinners. Recipes for the dishes included in these menu groupings follow.

Miss Brobeck also revives an old-fashioned standby, the chafing dish, well suited to the limitations of present-day entertaining. She presents appropriate chafing dish menus, lists the time-honored dishes for such culinary concocting, and adds a few new ones.

But even casserole and chafing dish menus call for salads and desserts, and so the proper dish in which to serve the salad and the proper salads themselves are detailed. The desserts on the whole, as befits the just-mentioned menus, and the times, are appropriately simple and easily prepared. A few recipes for sauces and beverages complete the book which bears the benediction of Hendrik Willem Van Loon, distinguished trencherman and historian.

The Role of Nutritional Deficiency in Nervous and Mental Disease. Compiled by the Association for Research in Nervous and Mental Disease. Baltimore: The Williams & Wilkins Company, 1943. Cloth. Pp. 215. Price $4.

The papers here published under one cover in 1943 constitute the 1941 proceedings of the Association for Research in Nervous and Mental Disease, a meeting entirely devoted to a symposium bearing the title of the book under review. These proceedings were reported on p. 124 of this JOURNAL for February 1942, together with the titles of the papers which now appear as chapters.

Some of the viewpoints expressed in December 1941 have doubtless undergone revision in the interim. But the compilation as it stands represents a unique contribution to the literature, covering as it does practically all the knowledge then available relative to the broad subject discussed.

The verbatim reports of the discussions which followed the reading of the papers will be almost as interesting and enlightening to the dietitian and nutritionist as the papers themselves. It might be said, judged by their comments, that some of the assembled neurologists and psychiatrists could have more profitably taken a short course in the elements of the basic or "normal" nutritional needs of the patient before embarking on a discussion of nutritional deficiencies as these affect the mind and the nervous system.

True, the papers of Drs. Minot and McLester stress the need of obtaining "a first-class accurate dietary history," but they do not tell how to do it. However, in a discussion of Dr. Minot's paper, Dr. David T. Smith, a bacteriologist, not a neurologist, does direct attention to the common basic foods and shows understanding of the way in which the patient should be taught to eat what he needs. Unless the physician is able to do this, he suggests, "when he withdraws the vitamins as a drug, he [the patient] relapses into the same or even a worse state of nutrition." In short, the audience, before having become so deeply enmeshed in the prosthetic group, the enzymes and co-enzymes, might have profited by a clear-cut discussion of the simple fundamentals of basic nutrition and the technique of obtaining a diet history.

One notes such editorial oversights in the book as Hygieia for Hygeia, the inexcusable use of "it's" to denote the possessive, thiamin spelled both with and without the "e", and the tautological sin "consensus of opinion of everyone."

The excerpts which follow are from the address of Dr. Minot in which he stresses the average physician's inability to distinguish between dietary adequacy and inadequacy in terms of actual amounts of foods: "Racial customs, eccentricities, faddism, stupidity, are important causes for leading to faulty nutrition. Let us not forget that the doctor may be responsible. A patient has been given a diet for a peptic ulcer. The patient was so satisfied with his pasteurized milk and crackers that he continued with this food alone. He came back to the hospital some years later with full and classic signs of scurvy. Let the doctor realize that he may advise a special therapeutic diet, but also let him realize that except for a brief period of time it must be a complete diet.

"In treatment one has got to consider something more than ordering the diet and concentrates of vitamins and minerals. To order the diet is one thing but to cure the patient is another. An optimal diet does not mean the usual diet. The problem of nutritional deficiency concerns many factors including vitamins, proteins, salts, minerals, and so forth. . . . We must realize that the prevention of nutritional disease is better through the butcher and the grocery store than it is through the chemist and the apothecary store.

"The effects of food on vitality are fundamental and far-reaching. The benefit of better feeding usually becomes more evident after it has been continued throughout a large part of a life cycle and its effects may not be seen until a second generation. The great opportunity for utilization of modern knowledge of nutrition is in the prevention of unstable nutritional states. The prevention is much simpler and vastly more economical than treatment after bodily defects have occurred. The problem of nutritional deficiencies is the prevention of partial deficiency; adequate nutrition is one of the first lines of defense of this nation."

Food Planning for Victory. By Madeline Fess Mehlig, B.S., M.S., Director, School of Domestic Arts and Science, Chicago. New York: Grosset & Dunlap, Inc., 1943. Paperboard. Illustrated. Pp. 131. Price $1.29.

This is another book for the housekeeper on methods of adjusting her menu planning and day-to-day cooking to wartime conditions. There is nothing particularly new in it, but it represents a handy collection of facts and suggestions which, for those who have not saved clippings of such information or purchased a recent book of similar material, will be worth the price. Comic illustrations by the author's daughter and some light touches in the descriptive matter give the book a certain distinction. Mrs. Mehlig has had many years of experience in teaching applied nutrition, for public and private agencies, colleges, and in weekly broadcasts over WHA.

Home canning; vegetable cookery; planning menus with an eye to conservation of food, money, and ration points; and wartime cookery are covered thoroughly and the usual charts and tables are included. A final chapter on "post-war planning" is simply a compilation of the more familiar foreign dishes served in this country. There are some fine recipes for cooking variety meats and fish, and for making simple soups.

The book suffers somewhat from lack of careful editing, especially in certain carelessly worded phrases, due no doubt to the pressure of a publication "deadline." Examples are: "Don't serve beans, meat, fish and eggs at the same meal in wartime," "sufficient to cook the tender proteins of meat," and "adding minerals, iron, phosphorus, calcium, and some of the B vitamins."

There are some typographical errors, and the order in which the ingredients for certain recipes are listed is not according to accepted form.

The author suggests in the last chapter that every housewife should have a shelf of books on homemaking, and the book in question deserves a place on such a shelf.

Nutrition in Health and Disease. By Lenna F. Cooper, B.S., M.A., M.H.E., Edith M. Barber, B.S., M.S., and Helen S. Mitchell, Ph.D. Ninth edition. Philadelphia: J. B. Lippincott Company, 1943. Cloth. Pp. 716. Price $3.50.

This excellent text continues to demonstrate the well-coordinated team-work of its three authors and the advantage of having each of these three, as a specialist in her field, supplement and strengthen the contributions of her co-authors. The authors, of course, need no introduction to the readers of this JOURNAL, all having taken active and important parts in furthering the advancement of the American Dietetic Association and its members.

In the current edition this book continues to be sound, thorough and simple. While written for nurses, it should appeal as well to the intelligent lay public, while the tables and diet outlines and other practically helpful data will continue to aid the busy physician and dietitian.

In line with expanding knowledge certain revisions and additions have been necessary, in particular new paragraphs on the vitamins, and revisions in line with the yardstick of good nutrition and wartime food restrictions. Recent research, too, has been applied where necessary under Part Five which is concerned with cooking practices designed to conserve nutrients. New and more accurate figures have been interpolated in the table on Proximate Composition of Foods, including those for niacin, pyridoxine, pantothenic acid and biotin. An entirely new feature is a glossary of technical terms.

Truly it may be said that this widely-used text is now "better than ever."

Wartime Food for Four Income Levels. By Ruth Okey and Mary Gorringe Luck. Issued by The Heller Committee for Research in Social Economics. Berkeley: The University of California Press, 1943. Paper. Pp. 44. Price 35 cents.

The material published under the above title, in mimeographed form, is reprinted from "Wartime Budgets for Three Income Levels, Prices for San Francisco, March 1943," and "Quantity and Cost Budget for Dependent Families or Children, Prices for San Francisco, March 1943," and is a sequel to similar budgets prepared annually for use by social welfare agencies in the San Francisco area. According to the Introduction, "all food budgets have been kept high enough to meet the National Research Council's standards for nutritive adequacy when purchased except that the high riboflavin standard for the active man is not quite met in the dependency budget. Because of the very large increase in price and decrease in the local supply of fresh fruits and vegetables, however, the margin of safety which we have allowed in quantity and variety of these items in former years has been materially decreased."

For the first time menus for all budgets are now included and all have been written for families of the same composition for purposes of comparison, *i.e.* man, woman, boy of 13, and girl of 8 for the following income levels: executive, white-collar worker, wage earner, and dependent. Lists of possible substitutions follow the sample menus.

Coupon Cookery. By Prudence Penny. Los Angeles 15: D. E. Sanford Company, 1943. Paperboard. Pp. 128. Price $1.50.

As stated on the striking red, white, and blue jacket of this book, "the author has attempted nothing more than to make this an easy-to-understand, easy-to-follow cookery help until we are back to the good old days again and you can buy as much of whatever you please within the limitations of what is good for you." Like many other books of its type, the chief value is in the recipes designed to make the best use of rationed foods. Also, like many of its contemporaries, the book suffers from what may have been hasty printing and editing.

Be that as it may, the recipes in this book are highly practical and timely. The suggestions in the chapter called "Prudent Tips and Penny Savers" are especially useful and should help to enliven otherwise uninteresting and monotonous meals. A point value chart is included in which the housewife is instructed to insert current point values and prices of all rationed foods. Nonsense rhymes and cartoons are interspersed with the text matter for popular appeal.

Feeding Our Armed Forces. By Eleanor Hoffmann. New York: Thomas Nelson and Sons, 1943. Cloth. Pp. 86. Price $1.75.

This is a highly informative and fascinating book, of interest to all Americans, particularly dietitians, both civilian and in the Army, who are directors of large group services. All the monumental background of intricate details—the investigating, inspecting, developing, packaging, purchasing, shipping and preparing foods to feed an army of millions of men, stationed from the Arctics to the tropics—is covered methodically and accurately. And a highly important part of this vast and smoothly operating machinery, the U.S.Q.M.C., is the office of Mary I. Barber. As the author states: "Perhaps no branch of the Services of Supply, except, of course, the Medical Corps with its nurses and hospital dietitians, turns so much to women for advice as the Q.M.C. and its Subsistence Branch." While the Commander of each Service Command is responsible for the menu, the actual planning is usually assigned to the Commandant of the Bakers and Cooks School in the area. But the menu as planned must first be examined and checked by dietitians and nutrition experts at Q.M. Headquarters in Washington. Each Service Command receives a master menu, 90 days before the month for which it is to be used, which must be sufficiently flexible to be adaptable to climatic and other conditions affecting supplies, especially of fresh fruits and vegetables.

An interesting feature described is an invention called a "Ration Breakdown Board" designed for rapid calculation of one of the dietitian's daily problems; *i.e.*, if it takes 3 pounds of coffee for 100 men, how many pounds are necessary for 79 or 233? The answers served up by this modern ouija board, it appears, are as accurate as those shot out by an adding machine.

America's Cook Book. Compiled by the Home Institute of the New York *Herald Tribune*. Third edition (including a Wartime Supplement). New York: Charles Scribner's Sons, 1943. Cloth. Pp. 1032. Price $2.50.

Now and then books are aptly titled and the claims on the jacket, commonly called the publisher's "blurb," well substantiated. This is true of *America's Cook Book*, the third edition of which includes a wartime supplement of 23 compact pages, largely concerned with extending rationed foods, methods of using nonrationed or low-point value foods, and revisions of recipes in line with present needs.

Very low in price when compared with other recent culinary items, the book is beautifully illustrated in colors and black and white. It contains 3299 recipes and 128 menus, cooking and baking temperature and time tables, purchasing guides, tables of equivalents, vitamin and mineral charts (suitable for the layman), a bibliography, a glossary of foreign words and phrases concerned with cooking, an unusually excellent index, and other useful features. It deserves a place on every dietitian's reference shelf.

Visual Nutritive Values Set. By Elspeth Bennett, Assistant Professor, Foods and Nutrition, College of Home Economics, Syracuse University. Syracuse: Bardeen's, Inc., 1943. Price $10.

This set of charts showing the nutritive value of 52 common and basic foods and two breakfast meals is a graphic and most helpful teaching device.

The values given for calories, protein, calcium, iron, and vitamin A, thiamin, ascorbic acid, and riboflavin, were taken from Sherman's *Chemistry of Food and Nutrition*, The Macmillan Company, 1941: others were taken in each instance from the best available source. The unit of value used is the "share," a system devised by Mary Swartz Rose. Each nutrient is represented by a colored movable shaft with the name of the food printed at the top and the nutritive value in calories or weights and shares at the bottom. Cardboard shaft holders with wood bases are provided in which one can assemble the shafts either to show the nutritive value of a single food or to compare several foods as sources of any one nutrient.

An additional chart with an easel shows on one side the recommended daily allowances for children at different age levels and on the other side the requirements for adults. Thus one is able to show to what extent a food meets the nutritive requirements of different persons. Several blank shafts of each color are provided so that lost shafts may be replaced or sets may be assembled to represent additional foods. An excellent manual showing many ways to use the material is included. The *Visual Nutritive Values Set* provides a colorful and easily understood device for group or individual teaching or for exhibit purposes.—DOROTHY B. HACKER, *Visiting Nurse Association, Detroit.*

News Notes

Army Needs Dietitians. An illustrated leaflet entitled "The Army Trains Student Dietitians," released by the U. S. Civil Service Commission, has been prepared in connection with the new examination announcements for student and apprentice dietitians. The closing date for applications for student dietitians for this year was November 4; applications for apprentice dietitian positions, however, will be accepted until further notice. Application forms are obtainable from the Civil Service Commission, Washington 25, D. C., any first- or second-class post office, or regional offices of the Civil Service Commission. The salary for student dietitian is $420 a year plus overtime pay (which amounts on an annual basis to 25% of basic salary, 8 of the 48 hours weekly being considered as overtime), subject to a deduction for subsistence and quarters and 5% for retirement purposes; that for apprentice dietitian, $1440 a year plus overtime pay, less 5% deduction for retirement, the apprenticeship period being 6 months.

As announced by Major Helen C. Burns at the Pittsburgh meeting of the A. D. A., applications for the 6-month apprentice dietitian course will now be accepted not only from those who have completed a 6-month training program in an approved course (*see* p. 708 this JOURNAL for October), but also from those who have had institutional experience in the form of 2 years of college teaching of food, nutrition, or institution management; or 2 years' high school teaching of food and, in addition, management of school lunchroom or school cafeteria serving 200 or more people at each meal; or 2 years in the management or direction of a school lunch program, or an industrial or commercial food service serving 200 or more people at each meal. Applications will also be accepted from those who have had 2 years of nutrition work with a social service or public health agency. Details concerning educational and other requirements are given on the application form for apprentice dietitians obtainable from offices listed in the preceding paragraph. These applications are acceptable at any time. Major Burns stressed the fact that the apprentice course is a civilian course. In general, only 2 or 3 apprentices will be appointed to each hospital approved for this purpose.

According to information released by the Officer Procurement Service at the Pittsburgh meeting, applications for appointment as Medical Department Dietitian should now be made to the nearest district office of the Officer Procurement Service, a list of which appeared in this JOURNAL for August, p. 604. Appointments are being made on an officer status as second lieutenants without dependents, which is $1800 per year plus 70 cents per day subsistence allowance. Those on foreign duty receive a 10% increase in base pay. The release adds that "a sufficient number of dietitians to fill all vacancies for foreign service usually volunteer; however, if the quota is not filled the required number will be detailed by order." Another change in requirements concerns social status. Applicants may be single or married and if married they are acceptable only if they are willing to accept assignments unreservedly and if they do not have dependents under 14 years of age. Married dietitians will be expected to occupy available quarters at the station.

Miami Valley Hospital Training Course. This course under Mrs. Mary Ruth Cutler is to be discontinued after the present class of student dietitians has completed its work, according to a communication received from Mrs. Cutler November 13.

Conference of Food Service Directors. This group, composed largely of managers and directors of school lunchrooms, many of whom attended the annual convention of the A. D. A. in Pittsburgh, held a meeting on Saturday, October 23 at the Hotel William Penn, details concerning which will appear in a later issue of this JOURNAL.

Food Requirements and Allocations Committee. Marvin Jones, War Food Administrator, has appointed Roy F. Hendrickson, Director of Food Distribution, as chairman of this newly-formed committee, the membership of which represents all U. S. agencies that are claimants for food either for domestic or foreign account.

Mr. Hendrickson also has been designated as personal representative and deputy of the War Food Administrator on the Combined Food Board. He is "authorized to coordinate staff work incident to receiving and considering requirements and supply data, both as it relates to domestic and foreign claims on the U. S. food supply and in the case of foreign sources where the United States through the Combined Food Board is a party to the division of foreign food supplies." As chairman of the newly-formed committee, Mr. Hendrickson will be responsible for receiving all statements of food requirements and for recommending all food allocations.

Dietitians Appointed to Medical Department, A.U.S., From Billings G.H., Fort Ben Harrison, Indiana. The following dietitians were appointed in March, according to word received from Adele A. Bowman: Luceil Messersmith, Jessie Levin, Rosalyn Seigel, Maurine Chomplin, and Miss Bowman. All were commissioned second lieutenants with the exception of Miss Messersmith, who is a first lieutenant.

Nutrition Program Materials. A packet of revised nutrition charts and other materials has been received from the National Dairy Council, 111 No. Canal Street, Chicago, through the courtesy of Mrs. Ethel Austin Martin, director, Nutrition Service, including: ten 15 x 20″ colored posters illustrating good and poor meals; a leaflet entitled "Wouldn't You Like to Know?" giving timely facts about nutritive values of dairy products; an 8½ x 11″ colored poster, "A Guide to Good Eating," with explanation in detail on the back; a booklet with the same title for distribution to housewives; a 4½ x 6″ miniature chart with the same title; a 4-page leaflet of "Suggestions for Leaders" listing advantages and uses of the materials; and a 4-page supplement to the charts including a table of nutritive values of the meals pictured in terms of calories, minerals, vitamins, and protein. According to Mrs. Martin, all nutrition information has been carefully checked with authoritative sources.

New leaflets available from USDA include: "Cooking With Soya Flour and Grits"; "Oven Drying"; and "Take Care of Pressure Canners."

The October 4 issue of *Life* contained a 10-page discussion of postwar food needs by Joseph J. Thorndike, Jr. Some of the excellent illustrations which accompanied the article might be useful as posters, including a map showing food consumption the world over and another showing food production in terms of arable lands; pictures of the food items in a New Zealander's diet and the diet of an inhabitant of India as illustrations of the best and worst diets in the world, together with a table showing the results in terms of average height, weight, life expectancy, etc.; picture of the Oslo breakfast; photographs of the Basic 7 foods and three equivalent meals captioned "expensive"; "cheap"; and "concentrated", the last being the Army K ration; graphic representations of what an acre will produce in various foods; and charts and photographs on milk production and food value of milk.

A manual entitled "Food for Children in Care Centers" has been prepared by the Division of Nutrition, Pennsylvania Department of Health, for the Bureau of Child Care, Pennsylvania State Council of Defense, intended for use by directors of child care centers in the daily planning of meals. All menus and recipes in the manual were developed and tested by expert authorities on nutrition to help meet current food shortages and rationing of canned fruits, vegetables, meats, and fish. The material was compiled chiefly by Louise Kaylor, assistant to Mrs. Anna dePlanter Bowes. The Foreword is written by Mrs. Marion Margery Scranton, commander, War Services, State Council of Defense. Contents of the manual include: (1) General discussion of food for children in child care centers—why it should be carefully chosen, how to make the noon meal meet children's wartime needs, a suggested pattern for noon meals. (2) Complete luncheon menus for 3 weeks. (3) Recipes, including suggestions for variations, for 25 and 50 servings for 12 main dishes; 5 soups; vegetables, including vegetable cookery table; sandwich fillings; 15 desserts. (4) List of other helpful food and nutrition literature for child care centers with prices and addresses of publishers or distributors.

The third edition of mimeographed material on "Nutrition Exhibits in Wartime," prepared by the Division of Nutrition, Bureau of Maternal and Child Health, Pennsylvania Department of Health, is available to a limited extent from the Nutrition and Conservation Branch, FDA regional offices. This material "suggests ways of dramatizing current food facts simply and effectively for persons of all ages." Most of the exhibits were developed by nutritionists of the Pennsylvania Department of Health, of which Mrs. Bowes is a staff member, and have been used successfully in clinics, child health centers, hospitals, schools, universities, libraries, stores, restaurants, etc. Available charts, posters and literature suitable for displaying in the exhibits are listed and described, and sources and prices furnished. Government and commercial sources of additional material are listed at the end of the manual. Suggestions for fresh foods or food models to be used in the displays are included.

"Wartime Food and Nutrition Course" is the title of a folder prepared and released by the Nutrition Courses Sub-Committee, Los Angeles City and County Food and Nutrition Committee, Citizens' Service Corps. The course is divided into 4 lessons. The first describes "the modernized version of the Nutrition Yardstick, streamlined to meet present-day shortages." Lesson 2 is titled "Protein Foods"; Lesson 3 "Protective Foods"; Lesson 4

"Energy Foods." The final pages cover planning the day's meals and include 2 menu patterns for the active, and inactive (or "office worker") types. A limited number of copies are available free, according to Helen E. Walsh, regional nutritionist, FDA, San Francisco. The folder is attractively illustrated in black and white and colors.

Food Rationing. Releases of OPA containing the following information have been received from Calla Van Syckle, Department of Information: Rationing tokens are scheduled to go into use early in 1944. These will be used as change for ration stamps. Each token, whether red or blue, will have a value of 1 point and will have no expiration date. After tokens go into use, all red and blue stamps will be assigned a value of 10 points each. The tokens, which will be slightly larger than a nickel and inscribed on both faces with the words "Office of Price Administration," and "Processed Foods" or "Meat, Fats, Fish, Cheeses," depending on the color, will be made of nonmetallic material and will save time and money for both the food trade and the government. Distribution of ration tokens will be handled in much the same way as money. Food retailers will obtain their tokens from participating ration banks in sealed boxes, each containing 300 tokens.

In release 3088, OPA announced that it is permitting schools, charitable institutions, and certain other institutional users to use unlimited amounts of processed foods produced from fruits and vegetables that ordinarily would not be distributed commercially. Provisions of this new ruling are described in detail in General Ration Order 5. Foods affected are: fruits and vegetables grown and processed by the institution; foods processed from gifts of fruits and vegetables, including local surpluses transferred to the institution by WFA; gifts of processed foods which were produced from noncommercial supplies of fruits and vegetables. According to the release: "The board will charge the institutions for the amount of these foods used at their current point value, generally 4 points per pound, but in no case will it charge an institution more for any item than 10% of the total points it received when it last applied for a regular allotment plus any supplementary points received since."

A release entitled "Rationing Controls for Home and Community Canning," based on the text and authorized interpretations of Amendment 27 of Ration Order 13, has been prepared as No. 63 of the Food Information Series, Office of Information, USDA, Washington 25.

Civilian hospitals may now resort to a new priority system for procuring eggs. Under a new ruling of WFA, hospitals may obtain priority certificates from regional WFA offices and dealers will be obliged to fill orders of hospitals with such certificates first. Hospitals must first show that they have exhausted all means of obtaining eggs and have not been able to get 1½ eggs per person per day over a one-week period.

OCD Activities. The following publications designed for use by national organizations in preparing program materials and informing their membership on national war activities are available from the National Organizations Section, Office of Civilian Defense, Washington: "Manual for Volunteer Offices"; "Health Service in Wartime"; "Junior Citizens Service Corps"; "Civilian War Services"; "Services for Children of Working Mothers"; "Recreation in Wartime"; and "The Neighborhood in Action." All of the programs described in these publications are, of course, intended for use by volunteer workers.

National Food Situation. The 1943–44 wheat crop in Australia has been estimated tentatively at approximately 89 million bushels, according to USDA's Office of Foreign Agricultural Relations, or about 57% of that produced in 1942–43 and, with the exception of the 1940–41 crop, the smallest since 1919. Reduced acreage and indicated reductions in yields per acre account for the expected low crop. The 1943 wheat crop in Europe, excluding the Soviet Union, is estimated at around 1540 million bushels, indicating the best harvest since 1939 and a crop about 10% larger than the poor out-turn of 1942. Weather conditions this year in Europe were much more favorable than during the preceding season. Acreage expansion was largely responsible for the increased returns, though yields were better than in 1942, especially in the Balkans, France, Italy, and most of Central Europe.

Warehouses in Puerto Rico and the Virgin Islands now hold 2 to 3 months' supply of basic foods, as stated in a release from USDA October 7. Enemy sea action and shortage of shipping space a year ago had reduced the islands' food imports to the hunger point. Puerto Rico's food production this year is estimated as 30% greater than in 1941. As an added incentive to food production, sugar planters are required to undertake certain vegetable plantings to qualify for sugar benefit payments.

Through cancellation of 50% of delivery contracts of egg drying plants, approximately 130 million dozen shell eggs, or the equivalent in frozen form, should be available for civilian and military use during the period of seasonally low egg production this winter. Such action is possible since lend-lease commitments for dried eggs can now be met even if deliveries are curtailed during these months. FDA will also release up to 2,000,000 lb. of spray-process dried whole eggs for sale to commercial users. Storage restrictions and set-aside provisions on shell eggs were removed October 1 through revocation of FDO 40.

FDO 71, effective August 2, which made it possible for the Army Quartermaster Corps to obtain at least 10,000,000 lb. of the first marketings of 1943 crop turkeys for shipment to American armed forces overseas for Thanksgiving and Christmas dinners, was withdrawn November 1, all requirements having been met.

USDA announced that a national program for improving the turkey crop had been approved by Secretary Wickard and developed by the National Turkey Federation in consultation with officials of USDA's Bureau of Animal Industry. Its sponsors believe that the joint activity will substantially aid the nation's wartime food-production effort through improving the quality of turkey breeding stock, more efficient production and finally, superior turkeys for market.

WFA and OPA October 2 announced a reduction in consumer prices for peanut butter from the July level of 33.1 cents to about 26.5 cents per pound, or that of September 1942.

An amendment to FDO 18.3 increased quarterly quotas for tea packers and wholesale receivers from 60 to 75%, beginning October 1. This is the second increase made recently, the first, announced September 2, having increased quotas for the third quarter of 1943 from 50 to 60%. The new amendment also permits packaging tea in ¼-lb., ½-lb., and 1¾-oz. sizes.

WFA purchased U. S. grade 5 rice during October in addition to the grades specified under the current purchase program, so that rice millers in certain areas might supply the required quantity of rice of specified grades for governmental use under the set-aside order. Rice is being purchased for delivery to Hawaii, Puerto Rico, and Alaska and to certain governmental agencies operating outside the continental United States, as well as to countries eligible to receive foodstuffs under the lend-lease program.

The quota level for processors of cocoa beans was raised October 6 by amendment to FDO 25.1 as a means of increasing the supply of cocoa products for civilian, military and other essential wartime needs.

The "1944 outlook issue" of the *Demand and Price Situation* reports that although civilian employment has passed its wartime peak, total employment (civilian and military) may average slightly more in 1944 than in 1943. Average weekly earnings per worker are also expected to continue rising slowly, reflecting more overtime, higher basic rates of pay, the effect of incentive-pay plans, and a shift from low-paid to high-paid jobs. Budget expenditures of the federal government averaged nearly 7¼ billion dollars a month from January through August 1943. Production of durable goods, particularly war goods, will continue to increase for several months, but prospects are not so good for nondurable manufactures, including textiles and manufactured foods. Meat packing will continue at a high level during the remainder of 1943 and most of 1944, and steps were recently taken by WFA to encourage production of manufactured dairy products while restraining consumption of fluid milk. The canning industry is handicapped by lack of labor, and "production of other manufactured food," of which canning is an important component, has dropped sharply in recent months after seasonal adjustment. The third largest component in the index of nondurable manufactures is printing and publishing. This industry is restricted in its use of paper, and an increase in production in the near future seems unlikely. With well-sustained output of nondurable manufactured goods and services and a large production of nonmanufactured foods, no marked curtailment of the over-all supply of consumer goods and services is anticipated in the year ahead. Durable goods will, of course, be scarce, as will many individual nondurable items.

In 1943, 25% of our agricultural food production was allocated to military, lend-lease, and other special needs, compared with 14% in 1942 and 6% in 1941. With more persons in the armed forces, military demand for food is likely to increase, even though military stockpiles are drawn upon for part of the increased needs. Australia and New Zealand have been furnishing food to our troops on "reverse lend-lease," but our European allies do not have surpluses of the more important foods required by our armed forces. Furthermore, any surpluses which may be available in Europe or Africa will be required for the relief of liberated areas in Europe. Lend-lease and foreign relief demand will be especially strong for foods of high nutritive value, such as dried milk, dried egg, canned meat, soybeans, dried fruits, and fats.

Under the heading "The General Price Outlook," the following forecasts are made: Except for some further rise in prices of certain agricultural products, prospects are for little change in the general level of wholesale prices until either cost or demand conditions change. Significant changes in these factors are not to be expected before the end of European fighting at the earliest. The size of the change then will depend in part on the speed of events leading to the cessation of hostilities as well as on the extent to

which people foresee those events and adjust business operations. In this connection, a comparison of price movements in the present and previous war periods is instructive, especially if it is remembered that the 1918–21 reaction of prices occurred as it did largely because no one was prepared for a sudden end of hostilities or for the transition from war to peace. Wholesale prices of commodities other than farm and food practically doubled from 1914 to 1918. After declining sharply for several months following the Armistice, they began a rise which was faster and longer sustained than any rise during actual hostilities. This was followed by a swift decline which wiped out in 12 months the price gains of nearly 4 years. Both the small rise during this war and the present effective controls over prices and supplies point toward greater stability of nonagricultural prices during the transition to a peacetime economy than after World War I. After November 1918 wholesale nonagricultural prices fell for several months and then advanced nearly 50% in 16 months. Wholesale prices of farm products, on the other hand, at no time in 1920 were as much as 16% above the level in November 1918.

The *National Food Situation*, "1944 outlook issue," dated October 16, contains a graph showing that combined retail prices of all foods rose sharply from January to June 1943 and then declined. The recent decline in both food prices and cost of living is due in part to the roll-back on maximum prices of meats, butter, and certain fresh vegetables. Present indications point to a total food production in 1944 as large as or larger than the record output for 1943. Greater noncivilian requirements probably will more than offset increases in food output. It appears that for 1944 as a whole, we shall continue to have an abundant supply of cereals and as large a per capita supply as in 1943 of chickens, eggs, fresh fruits and vegetables, potatoes, dry edible beans and peas. Consumption of food fats and oils is likely to be maintained at the ration levels of recent months. It is expected there will be a smaller civilian supply of canned fruits and vegetables in the first half of 1944 than in the same period this year, but possibly an increase in the second half. Red meats and dairy products are expected to be in shorter civilian supply than during the current year. The net effect of smaller civilian supplies of meats and dairy products in 1944, according to the BAE, probably will be a diet slightly lower in calories, protein, and calcium.

The outlook for livestock products in 1944 is dominated by the prospective feed situation. With efficient management of the feed supply, the output of livestock products could be maintained at approximately the 1943 level.

The number of hogs on farms January 1 will be the largest in our history, and even if the 1944 spring pig crop is smaller than this year's, hog slaughter may still be several million head greater than in 1943. The number of cattle and calves on farms January 1 will be of record size, and in view of the limited feed supply and high feed costs, an increase in slaughter appears probable. Egg production in 1944 probably will be at least as large as in 1943, if not larger. With a larger slaughter of chickens culled from laying flocks, total production of chicken meat should be about the same as the all-time high in 1943.

The proportion of 1944 production allocated for noncivilian uses will depend to a large extent on military developments. As more Axis-held territories are liberated by the allies, relief shipments, especially to continental Europe, can be expected to increase. In any event, military and lend-lease requirements probably will be at least as great as this year and civilian demand for food will be equal to or even greater than in 1943.

The vegetable outlook for next year, according to the *Vegetable Situation*, is as follows: Of the 6 crops which constitute important sources of vegetables during the winter, this season's record crops of potatoes, dry edible beans, and dry field peas will provide ample supplies. Sweet potato production is indicated at 10% above last year's, the onion crop is expected to be only slightly smaller than average, and cabbage production for the fresh market 12% smaller. Supplies of processed vegetables for civilians are likely to be somewhat smaller during the 1943–44 season; of potatoes, 10 to 15% larger.

The corresponding issue of the *Dairy Situation* states that in 1944 the limited supply of feed concentrates in deficit feeding areas is expected to bring about some reduction in both milk production per cow and total milk production. The total national production of 122 billion pounds suggested by WFA will require a 2% increase over present cow numbers and annual production per cow 50 lb. above the average of 1943 but 100 lb. below the record average rate of 1942, and will also require that a larger proportion of feed supplies be used for milk production. If dairy farmers do not get a larger share of the 1944 food concentrate supply and if hay and pasture yields are only average, both cow numbers and production per cow may fall short of the suggested levels and milk production may total no more than 116 billion pounds.

In a release dated October 16 designating certain milk sales areas and establishing base sales quotas, WFA announced that deliveries of milk, cream, and milk by-products to nursery, elementary, junior high and high schools, to plants processing milk, to the armed forces, and to other milk handlers are quota-exempt. Consumers in the milk sales areas which have been designated in various parts of the country generally will be able to purchase as much milk under the milk conservation program as they have been buying in recent months—within the limits of local supplies. Fluid milk sales are being stabilized to help assure sufficient milk for manufacturing the cheese, butter, evaporated milk, and milk powder required by the armed services and civilians "for good nutrition and properly balanced diets." According to FDA officials, the dealer-quota plan is an attempt to stabilize fluid milk consumption without resorting to individual consumer rationing. "Point rationing of milk, a bulky and highly perishable commodity, would be very difficult to administer."

WFA announced October 13 the rates of payment which would be made to farmers delivering whole milk and butterfat to offset increases in dairy feed costs since September 1942.

At a recent meeting of WFA's Cheese Industry Advisory Committee, held in Washington, it was pointed out that increasing food needs in war-ravaged Europe and greater available shipping space may accelerate the demand for cheese exports, both to our allies and to countries liberated from Axis aggression. While some processed cheese is being requested for overseas shipment, large quantities of natural cheese will continue to be needed. It was agreed that some action should be taken to head off the recent trend to manufacture "new" dairy products to escape the set-aside order and the uniform price ceilings on standardized products. It was reported that additional exportable supplies of dairy products might become available to the United Nations.

In an amendment to FDO 42, WFA increased quotas of fats and oils permitted in the manufacture of household soaps and industrial and abrasive soaps. Contrary to tentative plans previously announced, there will be no exemption for soap supplied to public institutions, hospitals or factories.

WFA's *Cold Storage Report* released October 15 contains statistics showing that all cold storage items with the exception of frozen fruits, cheese and poultry were heavier than October 1, 1942 stocks.

To facilitate military purchases, WFA "froze" all stocks of sauerkraut in the hands of packers October 11 and required them to set aside all such stocks for government purchase. As soon as military requirements had been met, the set-aside regulations were to be suspended and all remaining kraut supplies made available for civilian use. Indications were that the cabbage crop would not be large enough to supply fully the demand for fresh cabbage and for kraut for military and civilian use.

Early shipments of grapefruit for fresh consumption from the lower Rio Grande Valley region of Texas were limited by government order. About 48% of the estimated Texas grapefruit crop will be used for processing as compared with 45% last season. The prospective crop for the 1943–44 season is estimated at 16,800,000 boxes, compared with 17,100,000 boxes last season.

Effective October 18, amendment 3 to FDO 75.2 required that all federally-inspected slaughterers set aside 45% of utility grade steer and heifer beef that comes within the range and other specifications set by the Army for this grade for the use of the armed forces and war service. WFA states that the expansion of provisions to include utility beef in addition to the beef previously meeting army specifications has been made in order to broaden the range of army purchases and reduce the necessity of cutting so deeply into supplies of better grades of beef which may now become available for civilian consumption.

Food Compression. To utilize fully the air, land, and ocean cargo space available, and to save container materials, WFA has undertaken a compression program to reduce from 20 to 80% the bulk of a number of important dehydrated foods including cheese and pea-flavored soya soups, which are being exported to meet war requirements. According to a release from USDA dated October 25, chemists of the ARA have found that dehydrated, compressed carrots and eggs retain more vitamin A than when uncompressed. As an additional means of minimizing vitamin losses, an inert gas is used to replace the air in tins containing cabbage and carrots. A form of compression also is being applied to wheat flour. Some other foods are actually compressed into a block, but wheat flour is "compacted." Flour bags pass under heavy rollers, which square up the package and squeeze out air, reducing bulk by about 20%.

Other products are being tested by ARA to determine their adaptability to compression. Foods which have been compressed appear as compact blocks, usually wrapped in cellophane or treated paper. Foods are compressed only to the point where they can still be easily reconstituted. A brick of compressed carrots, 2¼ x 6½ x 4½", weighs 2¼ lb. Reconstituted, it makes 50 to 60 servings, and 16 bricks of this size constitute a standard package.

Supervised Homemaker Service. The Children's Bureau, U. S. Department of Labor, Washington, has published a booklet of information about supervised homemaker service, a method of

child care for social agencies, principally family and child-placing agencies. The term "homemaker service" replaces the old term "housekeeper service" which was limited to mean the service of women employed by a social agency as homemakers or mother substitutes, as housekeeping aides in homes of needy persons—such as temporarily or chronically ill or old persons—or as visiting housekeepers combining practical services with the teaching of home management. The new term has been accepted as more nearly describing the service given by social agencies and the degree of responsibility assumed by the homemakers. Training materials listed in the booklet include the purchase, preparation, and serving of food, personnel practices, financial support, use of advisory committee, and community planning for supervised homemaker service. This publication will be furnished free upon request.

American Institute of Chemists. At a November meeting of the New York Chapter of the Institute, Dr. Charles Glen King, scientific director, the Nutrition Foundation, spoke on "The Chemist's Place in Postwar Nutrition."

Borden Award in Nutrition. This award, given in recognition of distinctive research by investigators in the United States and Canada concerned with the nutritive significance of the components of milk or dairy products, will be made primarily for the publication of specific papers, but the judges may recommend that it be given for important contributions over an extended period of time and may be divided between two or more investigators. Nominations for the award must be in the hands of the chairman of the Nominating Committee, Dr. Henry A. Mattill, State University of Iowa, by February 1, 1944 and should be accompanied by such data relative to the nominee and his research as will facilitate consideration for the award.

Dr. Martha Kramer Repatriated. In a letter to the JOURNAL dated October 28 Charles H. Corbett of the Associated Boards for Christian Colleges in China writes as follows: "This morning we received from Bombay a message from Dr. Galt giving the list of the Yenching group consisting of 21 names including that of Dr. Martha Kramer. We are glad to get this confirmation that they are actually on their way and the added information that they are well. The ship is expected here on or about December 2. We have hopes that we shall receive air mail letters from at least some of the group after they reach Rio."

Christine R. Pensinger Enters Commercial Field. Mrs. Pensinger, supervisor, Bureau of Institutional Housekeeping, State of Illinois, on November 1 entered the employ of Marshall Field and Company, Chicago, as food consultant. Mrs. Ethel Boyle, formerly assistant, will succeed Mrs. Pensinger as state supervisor.

Connecticut Dietetic Association. The first meeting of the 1943–44 season, held in the Embassy Room of the Hotel Hublein, Hartford, had as guest speaker Nelda Ross, Presbyterian Hospital, New York. Gladys Hill, Greenwich Tuberculosis Association, delegate, presented a report of the Pittsburgh meeting. The state association has reached a membership total of 98.

The Greenwich Tuberculosis Association recently prepared a leaflet for blood donors adapted from "Dietary Recommendations for Blood Donors" which appeared in this JOURNAL for May.

Connecticut dietitians in Army service include the following: Suzanne Carion, Veterans Home, Rocky Hill, now assigned to Station Hospital, Columbia Air Base, South Carolina; Mary C. Gardner, Fairfield State Hospital, now at Fort Ethan Allen, Vermont; Eleanor Kendall, Lawrence and Memorial Hospital, New London, now at Station Hospital, Camp Miles Standish, Massachusetts. Elsie Zimmerman, Fairfield State Hospital, is now in Africa. Lt. Jean Syyman, formerly a member of the Dietary Department, Grace Hospital, New Haven, is attached to the Army Hospital, Fort Belvoir, Virginia.

St. Raphael's Hospital, New Haven, has been receiving much help from the Red Cross Dietitian's Aide Corps and is planning still further cooperation with this unit in the coming year. The New Haven Red Cross Chapter has increased the number of qualified nutrition instructors from 25 to 46.

Of the three 1943 graduates of the University of Connecticut entering hospital dietetic training courses, two are in Army hospitals. Six of the undergraduate students managed the food services in rural work camps during the summer.

Recent appointments include the following: Stella Maisner, St. Mary's Hospital, Detroit, now assistant administrative dietitian, New Britain General Hospital, replacing Elizabeth Dickinson, now chief dietitian; Marion Tolman, Henry Ford Hospital, now therapeutic dietitian at New Britain General Hospital.

Andromache Tsongas, Hartford Visiting Nurse Association, has been awarded a Rockefeller Foundation Fellowship in Nutrition.

Adele Yelinek was married May 24 to Sgt. Timothy N. Kelleher, stationed at Camp Adair, Oregon. Mrs. Kelleher is continuing her work as dietitian at Hartford Hospital.

Mrs. Leah Kane O'Neill, formerly chief dietitian, New Britain General Hospital, has announced the birth of a son July 29.

Hawaii Dietetic Association. Officers for 1943–44 are: president, Mrs. Martha Reilly; vice-president, Mrs. Frances Wynn; secretary, Frances Janda; treasurer, Mrs. Antoinette Faaborg. Section chairmen are: Administration, Carol Michelson; Diet Therapy, Mary Murai; Professional Education, Lorene Kulas; Community Education, Mrs. Alice Trimble.

In September the Executive Board entertained the members at a breakfast in the Faculty Cottage of the Kamehameha Boys' School overlooking Pearl Harbor.

Massachusetts Dietetic Association. The following are student dietitians at Beth Israel Hospital for 1943–1944: Angela Abbadessa, University of Alabama; Maria Ballarino, Rhode Island State College; Saralee Bender, University of Minnesota; Betty M. Davis, Boston University; Mary Ann Glayston, University of Iowa; Margaret Gildea, Framingham State Teachers College; Jean V. Harrison, Ohio State University; Gertrude Kain, University of Akron; Andrea Pearce, University of New Hampshire; Phyllis Pierce, University of Vermont; Mary Woodward, Purdue University; Patricia Singer, Seton Hill College; Evelyn Temple, Framingham State Teachers College; and Annetta Turn, Oregon State College. Those at Boston Dispensary include: Frances Langari, Rita Cobin, Jean Lesperance, Vivian Wecker, Rosalind Goodhue, and Virginia Heggie. Massachusetts General Hospital lists the following: Phyllis Danforth, University of Maine; Dorothy Moll, University of Iowa; Clarice Piper, Syracuse University; Virginia Toews, Kansas State College; Rosemary Chaix, St. Catherine College; Elizabeth Thibeault, Framingham State Teachers College; Mary Macomber, Iowa State University; Daphne Schaub, University of Wisconsin; Seleta Wiseman, University of Tennessee; Betty Davis, Western Reserve University; Leona DeCock, Montana State University; Annette T. Durkee, University of New Hampshire; Dorothy Elsner, University of Minnesota; Mary B. Maddocks, University of Alabama; Marilyn Oldland, University of Colorado; Jane Anne Oliver, Muskingum College; Christine Miller, University of Connecticut; Kathryn Montgomery, Texas State College; Mavis Munch, James Millikin University; Louise Taliak, Baldwin Wallace College, and Amy Tsiang, College of St. Teresa. Peter Bent Brigham Hospital has accepted the following students: Ruth Clark, Rhode Island State College; Janet Spillman, University of New Hampshire; Elizabeth Douglass, William and Mary College; Edith Marks, Iowa State College; Hazel Matzinger, University of Wisconsin; Mrs. Mary Bronson, Washington State College; Mary Kascht, Clarke College; Phyllis Plaster, Washington State College; Mrs. Sally Ferguson, University of Alabama; and Jane Marquart, Ohio Wesleyan University.

The Women's Educational and Industrial Union administrative course has enrolled Mary Baggan, Rhode Island State College; Nancy Gosser, Pennsylvania State College; and Jane Halcombe, University of North Carolina.

Seven students have been accepted for the new graduate program in public health nutrition offered by the School of Home Economics, Simmons College, with the cooperation of the Harvard School of Public Health and the Simmons School of Social Work. The program leading to the master's degree includes supervised field experience with various community and state agencies as well as graduate study in the 3 cooperating schools. It has been planned especially to prepare students for leadership in the field of public health nutrition. Students are from Nova Scotia, China, Pennsylvania, Rhode Island and Massachusetts.

Simmons College also offers a course in Industrial Cafeteria Management given under the auspices of the U. S. Office of Education in their Engineering Science and Management War Training Program. This course began November 2 and is conducted 2 evenings a week for 15 weeks. It is offered tuition-free to experienced administrative dietitians and college graduates with a major in foods and nutrition, and it is hoped that this program will help to meet the needs of industry for qualified cafeteria managers. The course is under the direction of Mrs. Quindara Oliver Dodge.

Ruth White has announced her marriage to Dr. Percy Rogers Howe, director of the Forsyth Dental Infirmary. Elizabeth Whipple, formerly nutrition consultant, Michigan State Department of Health, succeeds Miss White at the Forsyth Dental Infirmary and Simmons College. Miss Whipple has just completed work for her master's degree under Dr. Lydia Roberts, University of Chicago.

Several former members of the staff, Massachusetts General Hospital, have returned, including Marion Ashman, Margaret Berry, and Helen Trimble, now head dietitian, Eye and Ear Infirmary, teaching dietitian, and head floor dietitian, Baker Memorial, respectively. Judith Judd is now at North End Diet Kitchen. Members of the class of 1942–43 student dietitians remaining in staff positions include Elizabeth Cavicchi, Edith Coyne, Margery Evans, Lois Farner, Elizabeth Parlin, and Louise Sargent. Of the 1942–43 graduates, Mary Dale is at Reed College, Portland, Oregon; Frances Jared and Marion Tilley are in the Army; Alta Kibler is doing research work with the Harvard Fatigue Laboratory; Marion McDonald is at the Deaconess Hospital; Mary

Patterson at Wyandotte General Hospital, Michigan; Mary Jane Renwick at Harper Hospital, Detroit; and Lois Stringfiel at Post Graduate Hospital, New York.

Two former staff members, Peter Bent Brigham Hospital, have received commissions in the Army. Lt. Beatrice Lagerholm is connected with a general hospital unit in North Africa and writes that she likes her work very much. Lt. Astrid Christiansen, recently at Fitzsimmons General Hospital, has been transferred to foreign service. Helen H. Braunger, a recent graduate, is now assistant dietitian, Methodist Hospital, Sioux City, Iowa. Mary O'Grady has accepted a position in a small hospital in Council Bluffs, Iowa, where she serves in an administrative and therapeutic capacity. Elizabeth Taylor is assistant administrative dietitian at the Women's Hospital, Detroit; Virginia Douglass, assistant dietitian, Women's Free Hospital, Brookline; Mary Lambertson and Barbara Emery, at the New England Baptist Hospital.

Irene Goodhue, formerly of the Forsyth Dental Infirmary, has announced her engagement to Mr. Floyd Clark, Brattleboro, Vermont.

North Carolina Dietetic Association. Lillian Belle Cosner and Myrabelle Docksey have left Watts Hospital, Durham, to enter the Medical Department of the Army as dietitians. Sara Sue Cassell, formerly assistant dietitian at Woman's College, University of North Carolina, Greensboro, is now in North Africa with an Army hospital unit.

Helen Strickland, formerly with S. and W. Cafeterias, has replaced Cleone Boyd as supervisor of school cafeterias, Greensboro. Jane Crow, newly elected president of the state association, and previously in the state extension service as city home agent in Statesville and Mooresville in charge of a food production and conservation project, has been appointed a member of the State Nutrition Committee.

The following have received certificates from the North Carolina Baptist Hospital Dietetic Department: Florence Ruth Bransford; Sue Rodwell, now assistant dietitian at Presbyterian Hospital, Charlotte; and Mattie Mae Reavis, now employed at North Carolina Baptist Hospital, Winston-Salem.

Philadelphia Dietetic Association. Food rationing, price control and wage stabilization were discussed at the November meeting by OPA representatives including Monroe Van Sant, chief of the Food Price Section, and Freda Becker, representative of the War Labor Board. Lillian Hack, St. Christopher's Hospital, reported on the A. D. A. convention.

Philadelphia institutions offering courses in dietetics, announce the following information regarding placement of recent graduates: Beaver College, one student each at Philadelphia Public School Cafeteria, Temple University Hospital, American Air Lines, University of Pennsylvania Hospital, Frankford Hospital, and General Electric Co. Another, a native of Puerto Rico, has returned to Puerto Rico to assume duties as dietitian in a hospital; Temple University, one student each at Newark Beth Israel Hospital, Newark, New Jersey, and Army Dietitian Training Course; Drexel Institute, five in hospitals, six in government service, and several in the commercial field.

Recent appointments include: Isabelle Roberts, formerly at Phoenixville Hospital, now administrative dietitian, and Elsie Ewertz, now therapeutic dietitian, Jewish Hospital; Lillian Mann, replacing Lucille Refshauge at Mt. Sinai Hospital; Zetta Thomas, now teaching dietitians, Presbyterian Hospital; Martha Gallaher and Virginia Jones, now at Episcopal Hospital.

Frances Feigert, Philadelphia General Hospital, has announced her marriage to Lt. James Trolinger, stationed at present at the Navy Air Base, Stanton, Florida.

Students at Philadelphia General Hospital include: Margaret McKibbin, MacMurray College; Jean Mabey, University of Utah; Christine Haines, Pennsylvania State College; Louise Nealon, Marywood College; Mary Louise Davis, Pennsylvania State College.

Wisconsin Dietetic Association. Susan F. West, president-elect of the state association, has been selected for lay charter membership in the state organization of Public Health Nursing in Wisconsin. Charter members are appointed from those interested in health outside the field of nursing, and assist in coordinating all activities concerned with health. At the October meeting of the organization Leona Pazourek, nutrition consultant, Illinois State Board of Health, spoke on "The Effective Part Which Nutrition Programs Have in Industrial Health."

Dagmar Tuomin, formerly of Milwaukee County Hospital and president-elect of the Milwaukee Dietetic Association, has enlisted in the Army, receiving orders to report to the Port of Embarkation, Brooklyn, New York.

Second Lt. Agnes Walish, stationed at Camp Ord, California, visited her relatives and friends in Milwaukee on a recent furlough.

Milwaukee County Institutions, of which Ada B. Lothe is head dietitian, graduated the following class of student dietitians, August 20: Hazel Craigie, Montana State College; Shirley Friedlander, University of Ohio; Alice Hanratty, College of St. Benedict; Elizabeth Hunter, University of Wisconsin; Marcella Klimesh, University of Minnesota; and Arline Moore, Mount Mary College. This is the first approved training course in Wisconsin.

Mrs. Grace Ullman and Mrs. Owen Royce, formerly of the Dietary Department, are filling vacancies at the Milwaukee County Hospital.

Nell Clausen, Ada Lothe, Alice Koinger, Ruth Dickie, Esther Johnson, Virginia Harms, and Mrs. Mae Reynolds, Mrs. Lillian Fried, Mrs. Ethel Keating and Mrs. Sarah Ellen Wenger were Wisconsin representatives at the A. D. A. meeting in Pittsburgh. Miss Lothe also attended the American Hospital Association convention in Buffalo.

News From Our Advertisers and Exhibitors. The fifth annual edition of "Vitamin Summary and Cereal Food Facts," published by the Nutrition Department of the *Quaker Oats Company*, is now available on application to the Nutrition Department of this company, 141 W. Jackson Boulevard, Chicago 4, Illinois.

Much of the material available at the commercial exhibits of the American Dietetic Association October meeting in Pittsburgh was concerned with helpful suggestions in extending the meat supply in institutions. Chief among these were the following:

A booklet prepared by Marie Gifford and her staff, *Armour and Company*, Chicago, which offers 69 ration recipes for meat. Included are suggestions as to economical use of meat ration stamps, menu planning, meat extending, leftovers, fats in wartime, and the salvaging of unusable fats. The booklet is free upon application, together with a leaflet on "Vitalox," a meat flavor innovation.

The *Pet Milk Company*, Arcade Bldg., St. Louis 1, Missouri, had prepared pages suitable for loose leaf filing in a notebook entitled "Stamp and Money-Stretching Meals" which included a list of essential foods and the Basic 7 food groups, recipes and menus. "Cookies From Home" offers suggestions for gift boxes for men in the armed forces. "Quantity Recipes for Sandwich Fillings" presents fish and meat fillings in amounts to make 100 sandwiches each.

The *National Peanut Council, Inc.*, Citizens and Southern National Bank Bldg., Atlanta 3, Georgia, which exhibited for the first time this year, offere l a booklet on the various uses of peanuts in quantity cookery. A chart on the vitamin contents of peanuts and recipes for peanut croquettes, dressing, rolls, muffins, pudding, and cake are included. The recipes were prepared primarily for nutritionists with the WFA who were anxious to have something available for the school lunch program. They have since been tried out in school lunchrooms, employees' cafeterias, and tea rooms, and the majority were checked in hospital dietary departments, by members of the Atlanta Dietetic Association. The National Peanut Council will be glad to furnish upon request the names of firms in a given district which carry peanut products. One brand of peanut flour, in a family-size package, was on display at the exhibit.

Recipe cards (in the convenient 4 x 6″ size for filing) for various meat and fish fillings with stated amounts to make 50 sandwiches each were offered by the *Quaker Oats Company*, Chicago; also economical recipes for meat loaf, vegetable chowder, tomato scallop, and meat balls.

A leaflet on the various uses and care of Wesson Oil, prepared by the Educational Department of *Wesson Oil & Snowdrift Sales Company*, suggested that this all-purpose vegetable oil may be used as a melted shortening, as a preservative, to enrich soups and gravies, for salad dressings, pan and deep-fat frying, and hot vegetable cookery. Another leaflet, "How to Count Your Vitamins," gives in tabular form the vitamin content of salad fruits and vegetables and some recipes for salad dressings.

Prepared by Betty Crocker of *General Mills, Inc.*, Minneapolis, an attractive red, white, and blue booklet entitled "Your Share" presents a fund of valuable information concerning ways of preparing appetizing, healthful meals with currently available foods. Suggestions for the preparation of variety meats—liver, heart, kidney, tongue, sweetbreads and brains—are followed by "tips" concerning low-point meats such as neck, flank, shoulder or breast. The many ways to use eggs and cheese, with several pages of recipes, are followed by recipes and facts relating to stretching the milk supply, extension of butter, and collecting, clarifying and salvaging drippings and fat. Several pages devoted to the use of vegetables include a time chart for cooking and attractive recipes for fresh and dried products. The section on desserts and sweets offers a variety of ways to save sugar, including the use of honey, when available, raisin topping, and jelly icing. Sections on foods in wartime, wartime menus, victory lunch-box meals, and hospitality in wartime complete this interesting and valuable booklet.

A product introduced by *Citrus Concentrates Inc.*, Dunedin, Florida, at the Pittsburgh meeting is "Sunfilled Pudding Concentrate" in 7 flavors. Each ounce of the concentrate makes a gallon of pudding when combined with ½ to ¾ lb. corn starch and ¾ lb. sugar, at an estimated cost of 37 cents. Flavors include: apricot, peach, pineapple, cocoanut, strawberry, cherry, and raspberry.

Other interesting material and literature displayed by the commercial exhibitors will be covered in future issues of this JOURNAL.

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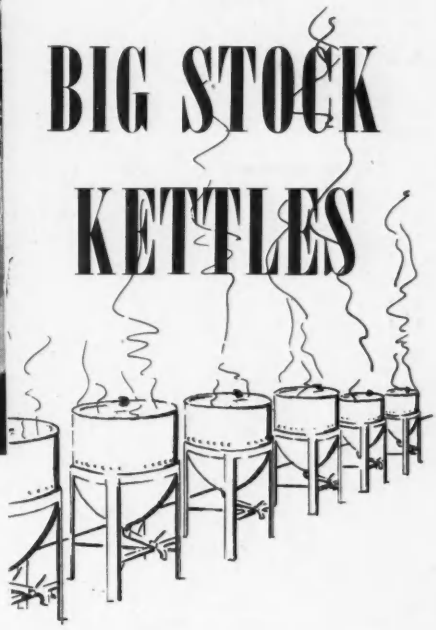

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